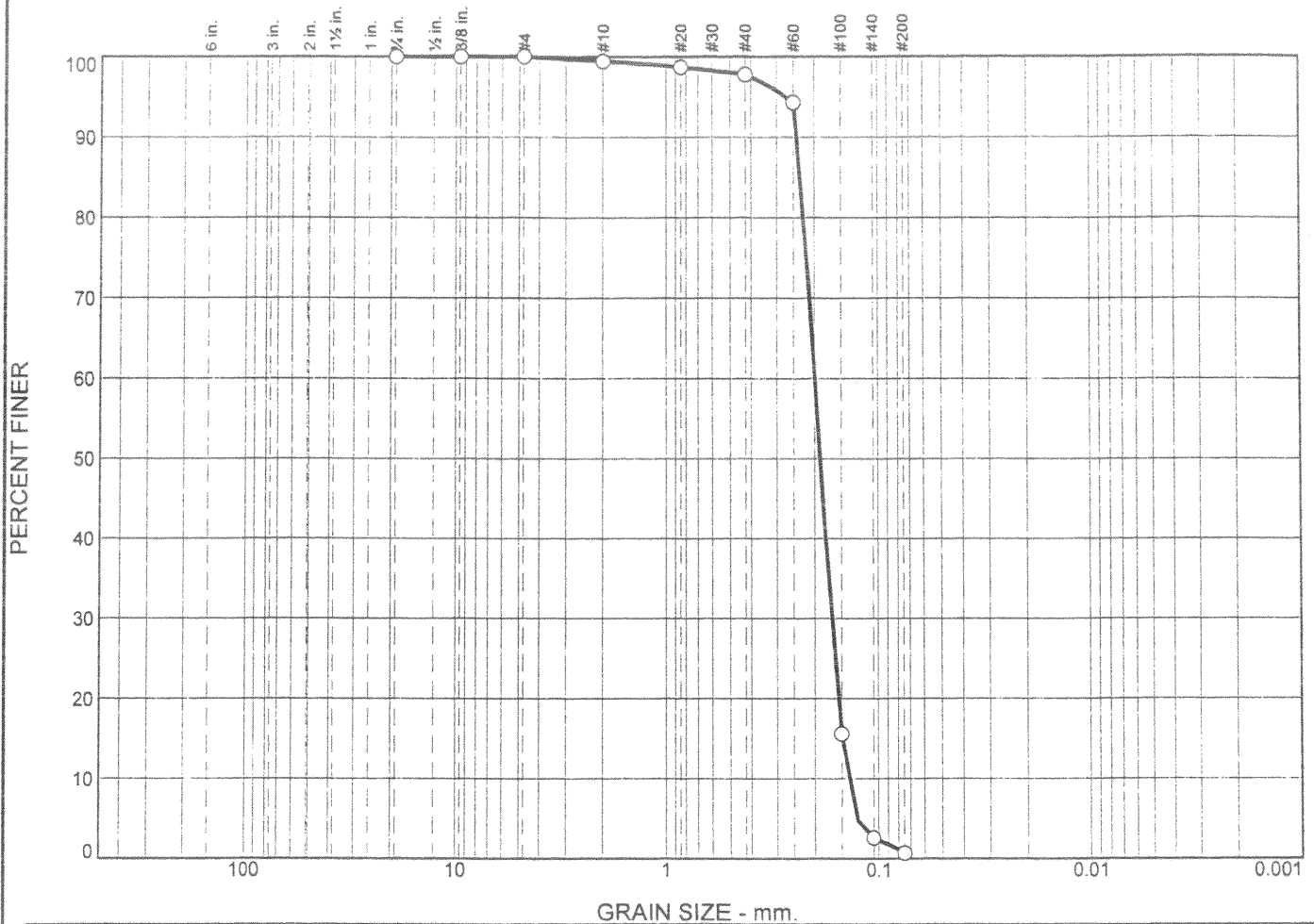
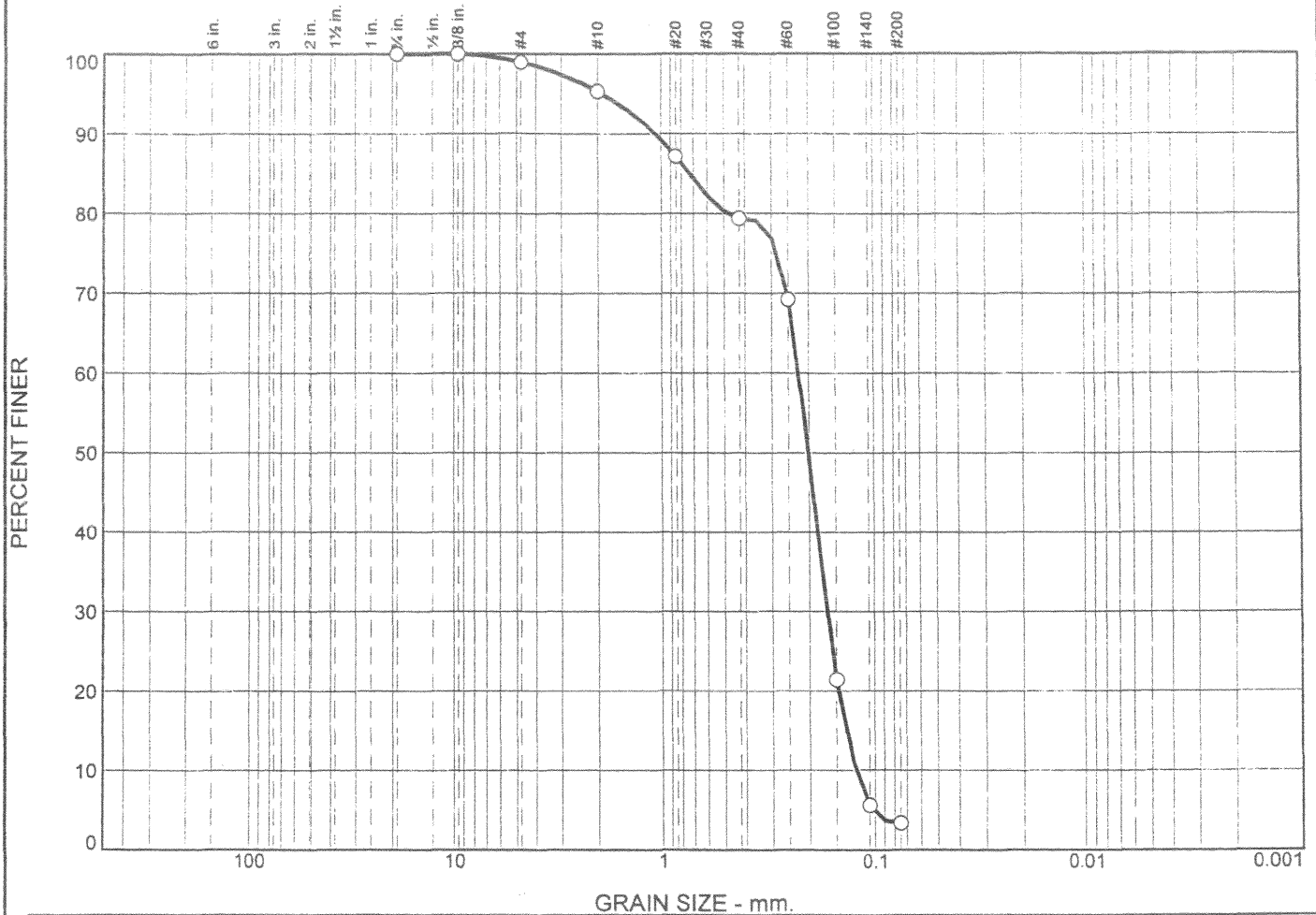


Particle Size Distribution Report

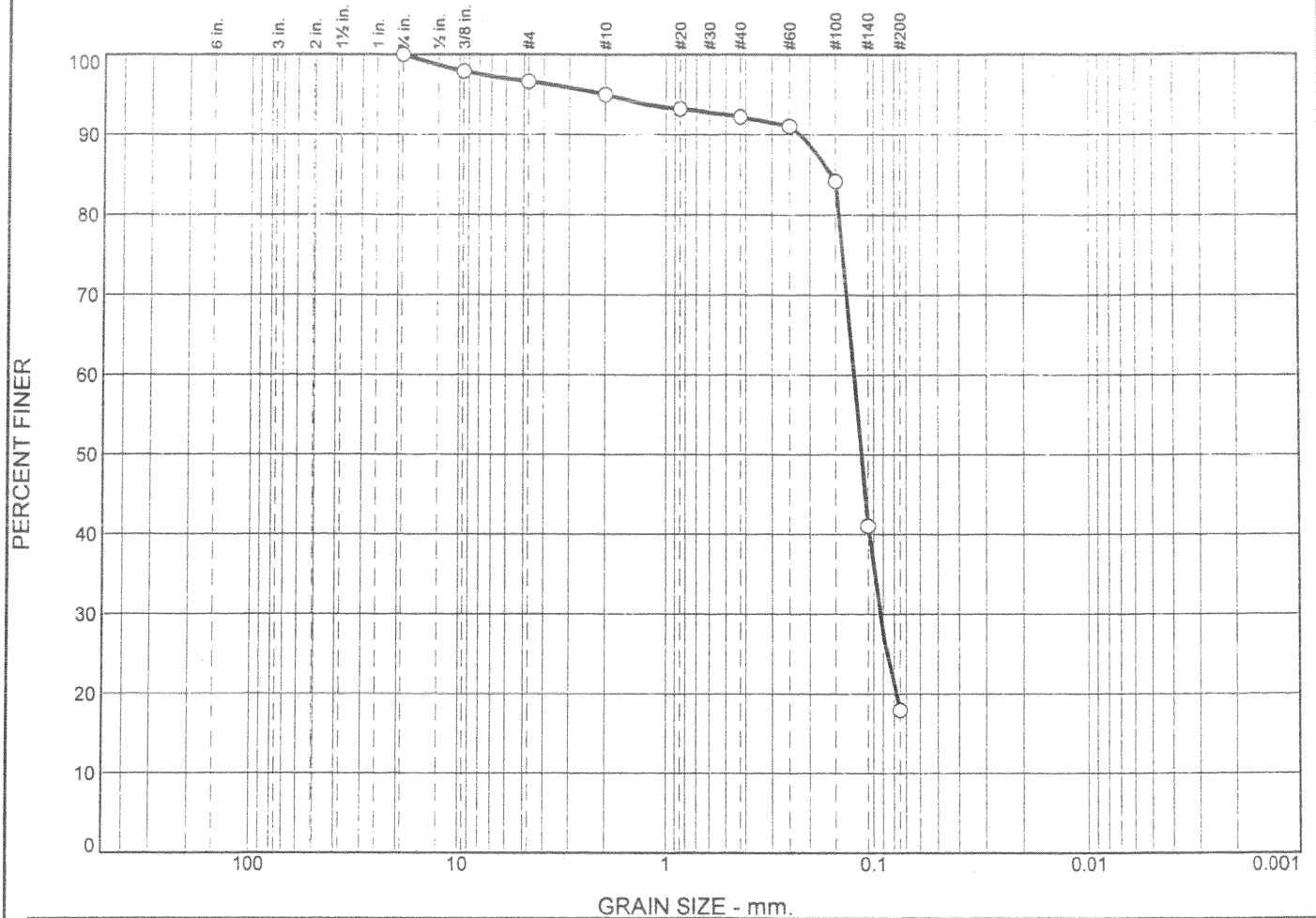


Particle Size Distribution Report



% +3"		% Gravel		% Sand			% Fines			
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay		
<input type="radio"/>	0	0	1	4	16	76	3			
<input checked="" type="checkbox"/>	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
<input type="radio"/>			0.7273	0.2225	0.2009	0.1653	0.1365	0.1232	1.00	1.81
Material Description								USCS	AASHTO	
<input type="radio"/> Poorly graded sand								SP		
Project No. 05-05-0013- Client: Black & Veatch Project: E.A.A (Reservoir) Source of Sample: CB-0205 Depth: 45' to 50' Date: <input type="radio"/>								Remarks: <input type="radio"/> Moisture Content % 22.5 CP05-EAARS-VB-0286		
Nodarse & Associates, Inc.										
Miami Lakes, FL								Figure		

Particle Size Distribution Report



	% +3"		% Gravel		% Sand			% Fines		
			Coarse	Fine	Coarse	Medium	Fine	Silt		Clay
<input type="radio"/>	0		0	3	2	3	74	18		
<input checked="" type="radio"/>	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
<input type="radio"/>			0.1566	0.1229	0.1141	0.0937				
Material Description									USCS	AASHTO
<input type="radio"/> Silty sand									SM	

Project No. 05-05-0013- Client: Black & Veatch
 Project: E.A.A (Reservoir)
☐ Source of Sample: CB-0205 Depth: 50' to 55'

Remarks:

☐ Moisture Content % 27.7
 CP05-EAARS-VB-0286

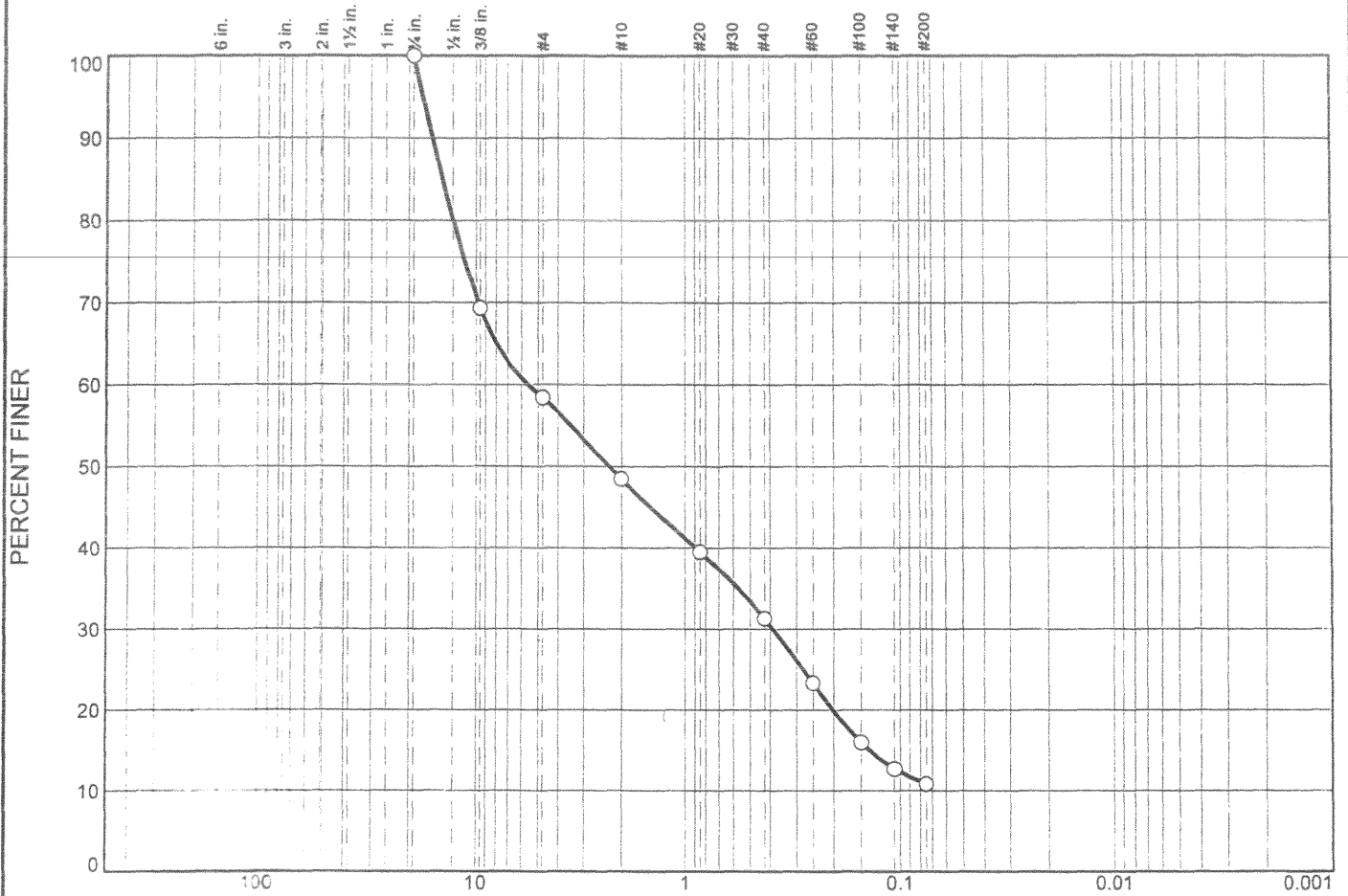
Date: ☐

Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Particle Size Distribution Report



GRAIN SIZE - mm.

	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
<input type="radio"/>	0.0	0.0	41.5	10.0	17.2	20.5	10.8	
<input checked="" type="checkbox"/>	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀
<input type="radio"/>			14.1250	5.5497	2.2752	0.3869	0.1374	

Material Description	USCS	AASHTO
<input type="radio"/> Poorly graded sand with silt and gravel	SP-SM	

Project No. 05-05-0013- Client: Black & Veatch

Project: E.A.A (Reservoir)W/O#6

☐ Source of Sample: CB205

Depth: 60.0'-65.0'

Sample Number: CB205

Remarks:

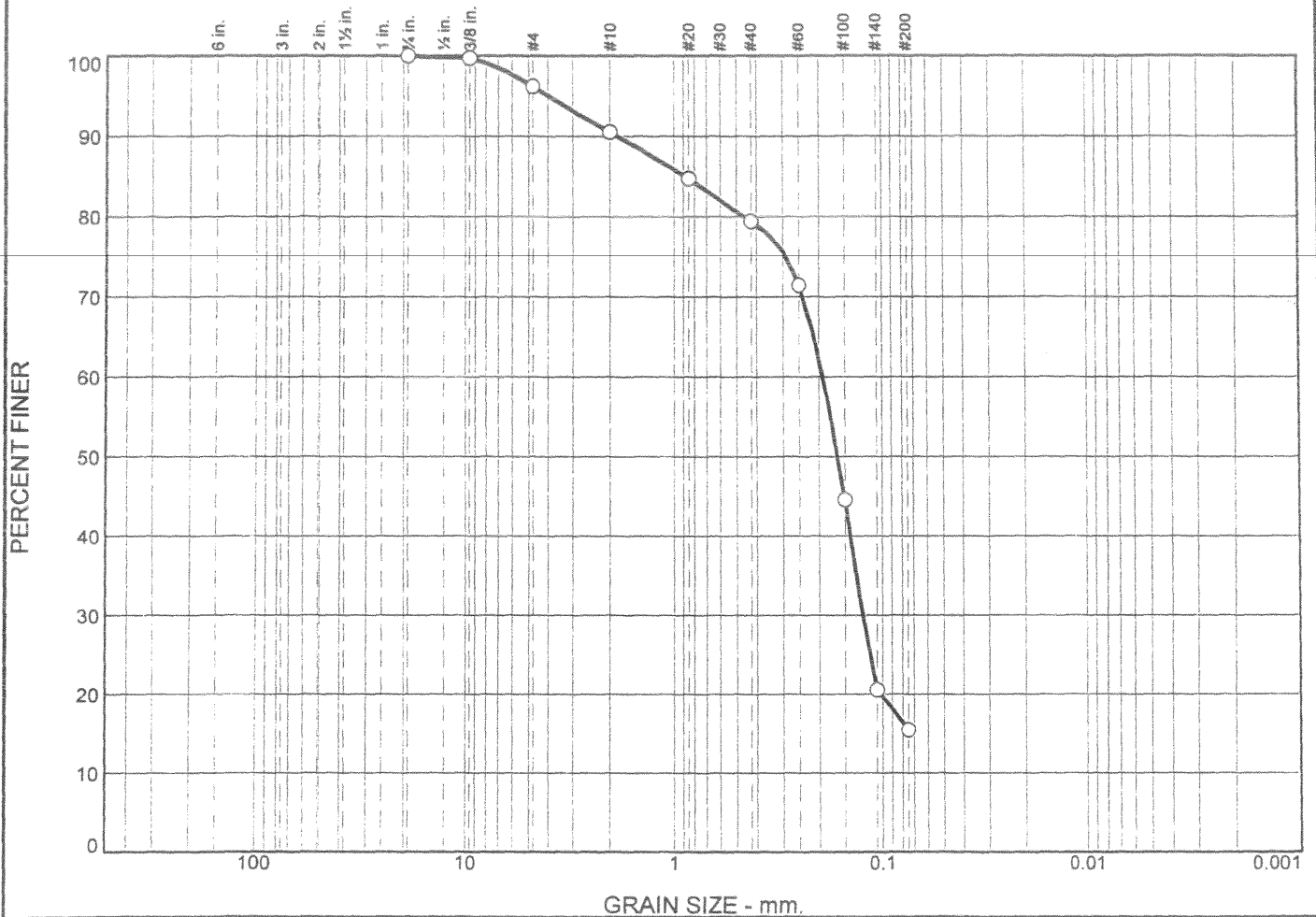
☐ Moisture Content % 14.2 CP05-
EAARS-VB-0286

Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Particle Size Distribution Report



GRAIN SIZE - mm.										
% +3"			% Gravel		% Sand			% Fines		
			Coarse	Fine	Coarse	Medium	Fine	Silt		Clay
<input type="radio"/>	0.0		0.0	3.8	5.7	11.1	63.9	15.5		
<input checked="" type="radio"/>	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
<input type="radio"/>			0.8815	0.1907	0.1619	0.1239				
Material Description								USCS	AASHTO	
<input type="radio"/> Silty sand								SM		

Project No. 05-05-0013- Client: Black & Veatch

Project: E.A.A (Reservoir)W/O#6

☐ Source of Sample: CB205

Depth: 65.0'-70.0'

Sample Number: CB205

Nodarse & Associates, Inc.

Miami Lakes, FL

Remarks:

☐ Moisture Content % 20.6 CP05-
EAARS-VB-0286

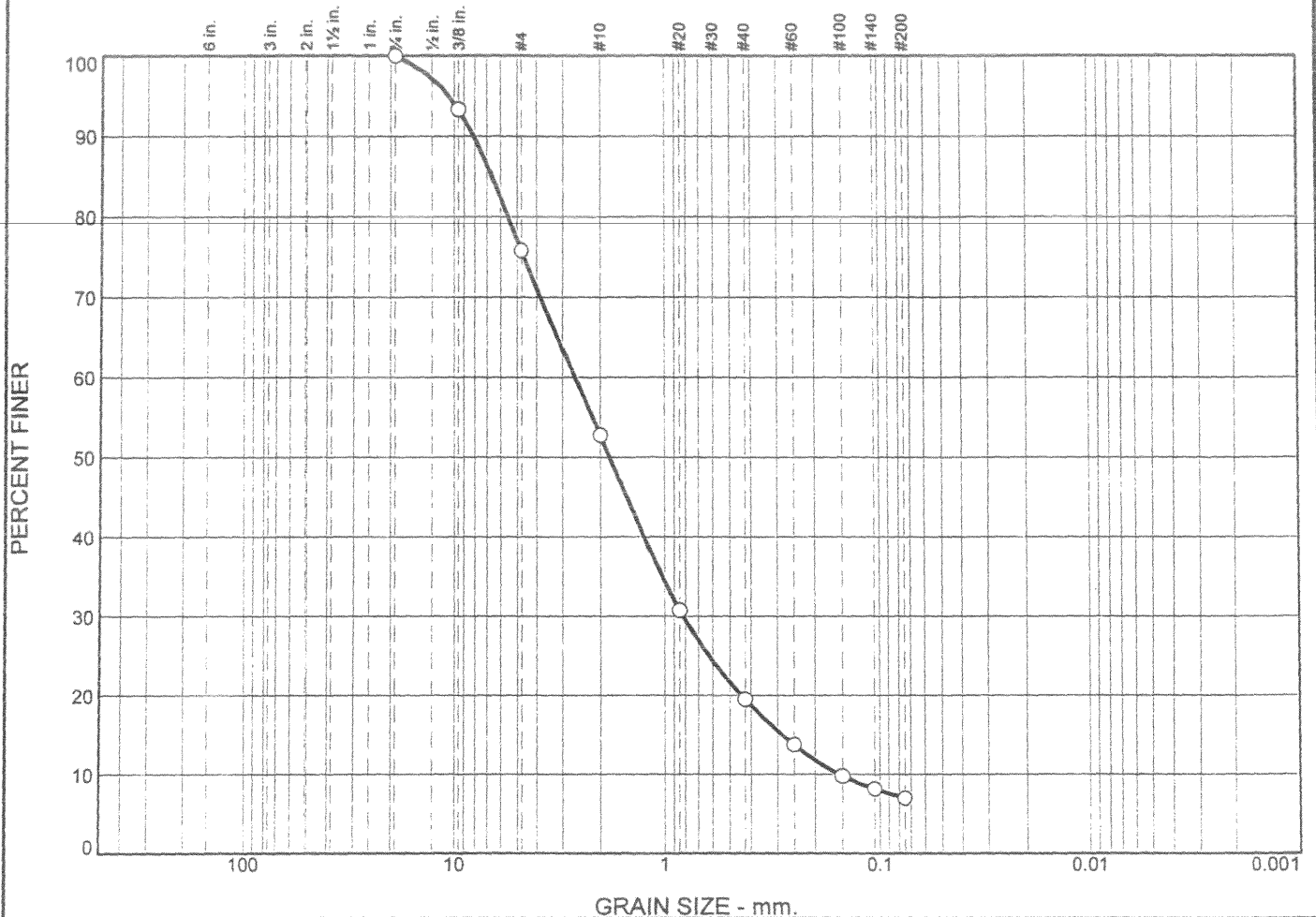
Figure

Grain size distribution curve showing Percent Finer versus Grain Size (mm). The curve is plotted on a semi-logarithmic scale.

Grain Size (mm)	Percent Finer (%)
100	100
60	90
40	83
25	73
15	65
10	55
7.5	49
6	42
4.75	25
3.75	14
3.0	12
2.5	11

App A Annex G-1-1331

Particle Size Distribution Report



GRAIN SIZE - mm.										
% +3"			% Gravel		% Sand			% Fines		
			Coarse	Fine	Coarse	Medium	Fine	Silt		Clay
○	0.0		0.0	24.2	23.0	33.3	12.5	7.0		
×	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○			6.6065	2.6252	1.8071	0.8197	0.2840	0.1554	1.65	16.89
Material Description								USCS	AASHTO	
○ Poorly graded sand with silt and gravel								SP-SM		

Project No. 05-05-0013- Client: Black & Veatch

Project: E.A.A (Reservoir)W/O#6

Source of Sample: CB205

Depth: 70.0'-75.0'

Sample Number: CB205

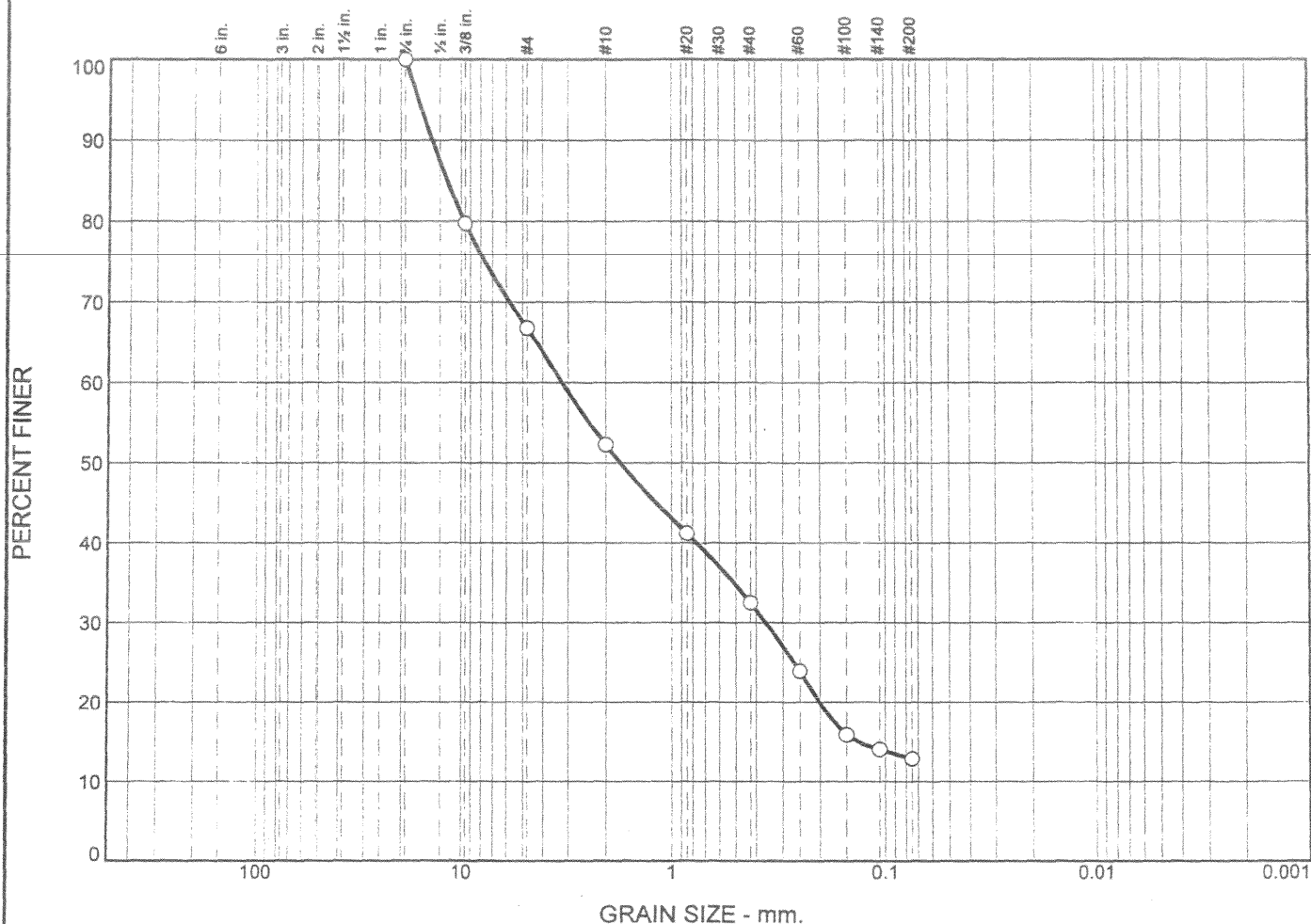
Nodarse & Associates, Inc.

Miami Lakes, FL

Remarks:

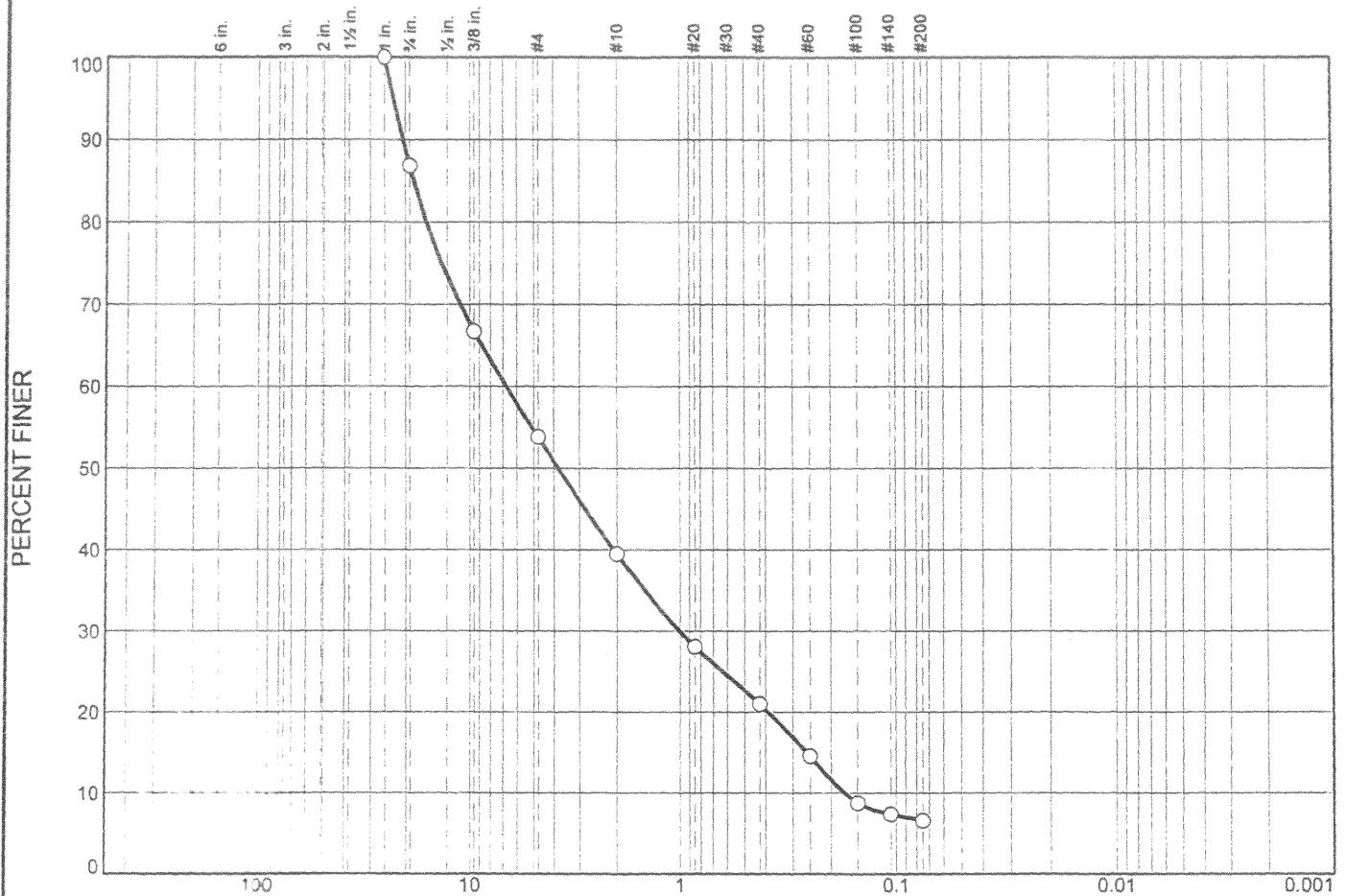
Moisture Content % 9.3 CP05-
EAARS-VB-0286

Figure



% +3"		% Gravel		% Sand			% Fines			
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay		
○	0.0	0.0	33.2	14.5	19.8	19.7	12.8			
×	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○			11.6744	3.1951	1.7104	0.3590	0.1333			
Material Description								USCS	AASHTO	
○ Well graded sand with silt and gravel								SW-SM		

Particle Size Distribution Report



GRAIN SIZE - mm.

	% +3"		% Gravel		% Sand			% Fines		
			Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	
○	0.0		13.2	33.0	14.3	18.5	14.4	6.6		
⊗	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○			18.2007	6.7382	3.7962	1.0033	0.2582	0.1729	0.86	38.97

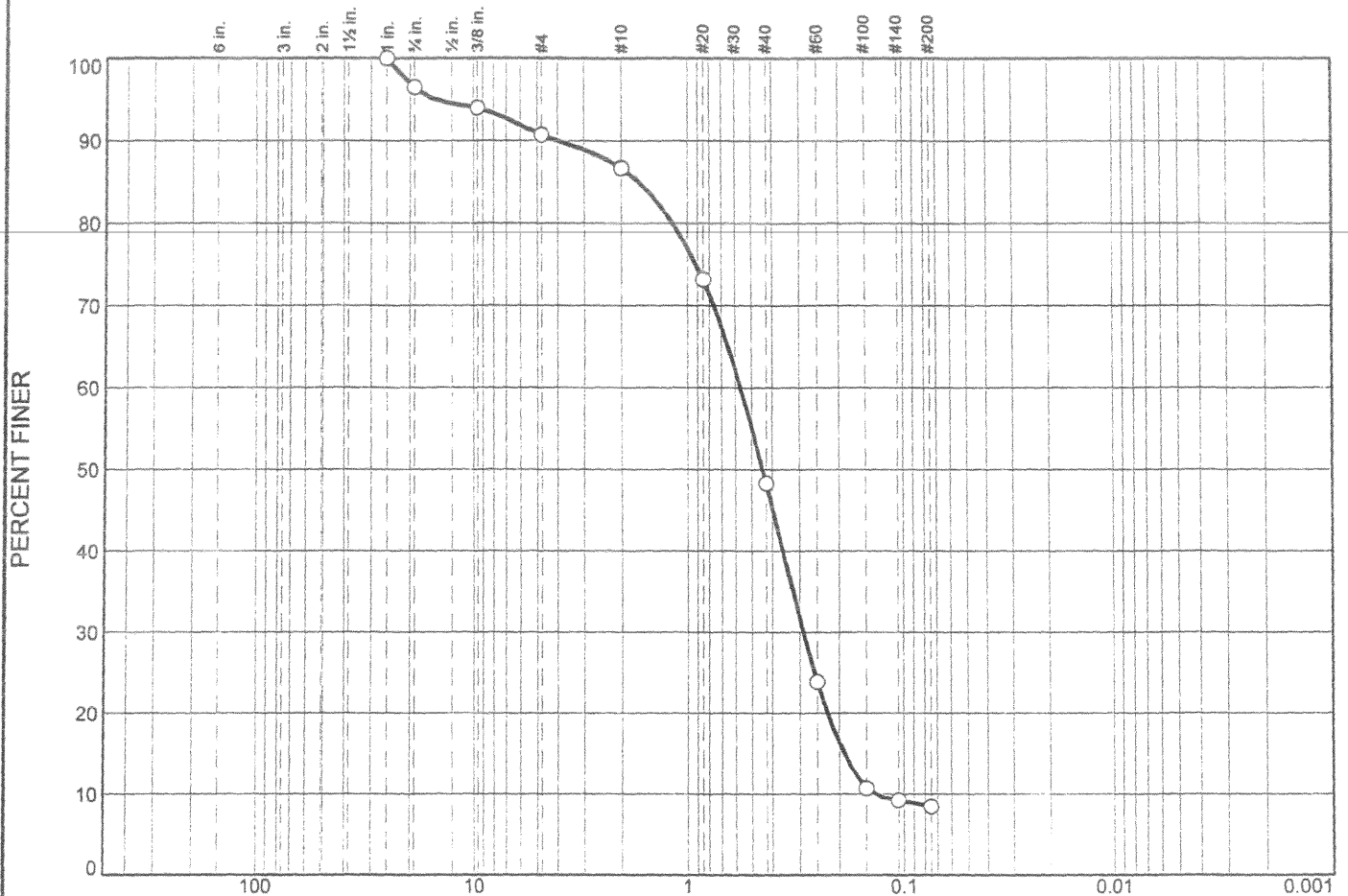
Material Description							USCS	AASHTO
Poorly graded sand with silt and gravel							SP-SM	

Project No. 05-05-0013- Client: Black & Veatch Project: E.A.A (Reservoir)W/O#6 ○ Source of Sample: CB205 Depth: 80.0'-85.0' Sample Number: CB205	Remarks: ○ Moisture Content % 11.7 CP05- EAARS-VB-0286
Nodarse & Associates, Inc. Miami Lakes, FL	
Figure	

Figure

Particle Size Distribution Report																																					
<table border="1"> <thead> <tr> <th colspan="2">% +3"</th> <th colspan="2">% Gravel</th> <th colspan="3">% Sand</th> <th colspan="2">% Fines</th> </tr> <tr> <th></th> <th></th> <th>Coarse</th> <th>Fine</th> <th>Coarse</th> <th>Medium</th> <th>Fine</th> <th>Silt</th> <th>Clay</th> </tr> </thead> <tbody> <tr> <td>0.0</td> <td>0.0</td> <td>0.0</td> <td>20.8</td> <td>14.1</td> <td>40.6</td> <td>17.4</td> <td>7.1</td> <td></td> </tr> </tbody> </table>											% +3"		% Gravel		% Sand			% Fines				Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	0.0	0.0	0.0	20.8	14.1	40.6	17.4	7.1	
% +3"		% Gravel		% Sand			% Fines																														
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay																													
0.0	0.0	0.0	20.8	14.1	40.6	17.4	7.1																														
<table border="1"> <thead> <tr> <th>LL</th> <th>PL</th> <th>D₈₅</th> <th>D₆₀</th> <th>D₅₀</th> <th>D₃₀</th> <th>D₁₅</th> <th>D₁₀</th> <th>C_c</th> <th>C_u</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td>7.9074</td> <td>1.6310</td> <td>1.1437</td> <td>0.5431</td> <td>0.2533</td> <td>0.1649</td> <td>1.10</td> <td>9.89</td> </tr> </tbody> </table>											LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u			7.9074	1.6310	1.1437	0.5431	0.2533	0.1649	1.10	9.89							
LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u																												
		7.9074	1.6310	1.1437	0.5431	0.2533	0.1649	1.10	9.89																												
Material Description							USCS	AASHTO																													
Poorly graded sand with silt and gravel							SP-SM																														
Project No. 05-05-0013- Client: Black & Veatch Project: E.A.A (Reservoir)W/O#6 Source of Sample: CB205 Depth: 90.0'-95.0' Sample Number: CB205							Remarks: Moisture Content % 15.1 CP05 EAARS-VB-0286																														
Nodarse & Associates, Inc. Miami Lakes, FL																																					
Figure																																					

Particle Size Distribution Report



GRAIN SIZE - mm.

	% +3"		% Gravel		% Sand			% Fines		
			Coarse	Fine	Coarse	Medium	Fine	Silt		Clay
○	0.0		3.5	5.8	4.0	38.4	39.8	8.5		
×	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○			1.6646	0.5627	0.4413	0.2885	0.1900	0.1379	1.07	4.08

Material Description							USCS	AASHTO
Poorly graded sand with silt							SP-SM	

Project No. 05-05-0013- Client: Black & Veatch

Project: E.A.A (Reservoir)W/O#6

Source of Sample: CB205

Depth: 95.0'-100.0'

Sample Number: CB205

Remarks:

Moisture Content % 16.8 CP05-
EAARS-VB-0286

Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

PERCENT FINER

Sieve Size	Percent Finer (%)
6 in.	100
3 in.	100
2 in.	100
1½ in.	100
¾ in.	97
½ in.	90
3/8 in.	74
#4	62
#10	50
#20	31
#30	25
#40	18
#60	12
#100	8
#140	6
#200	5

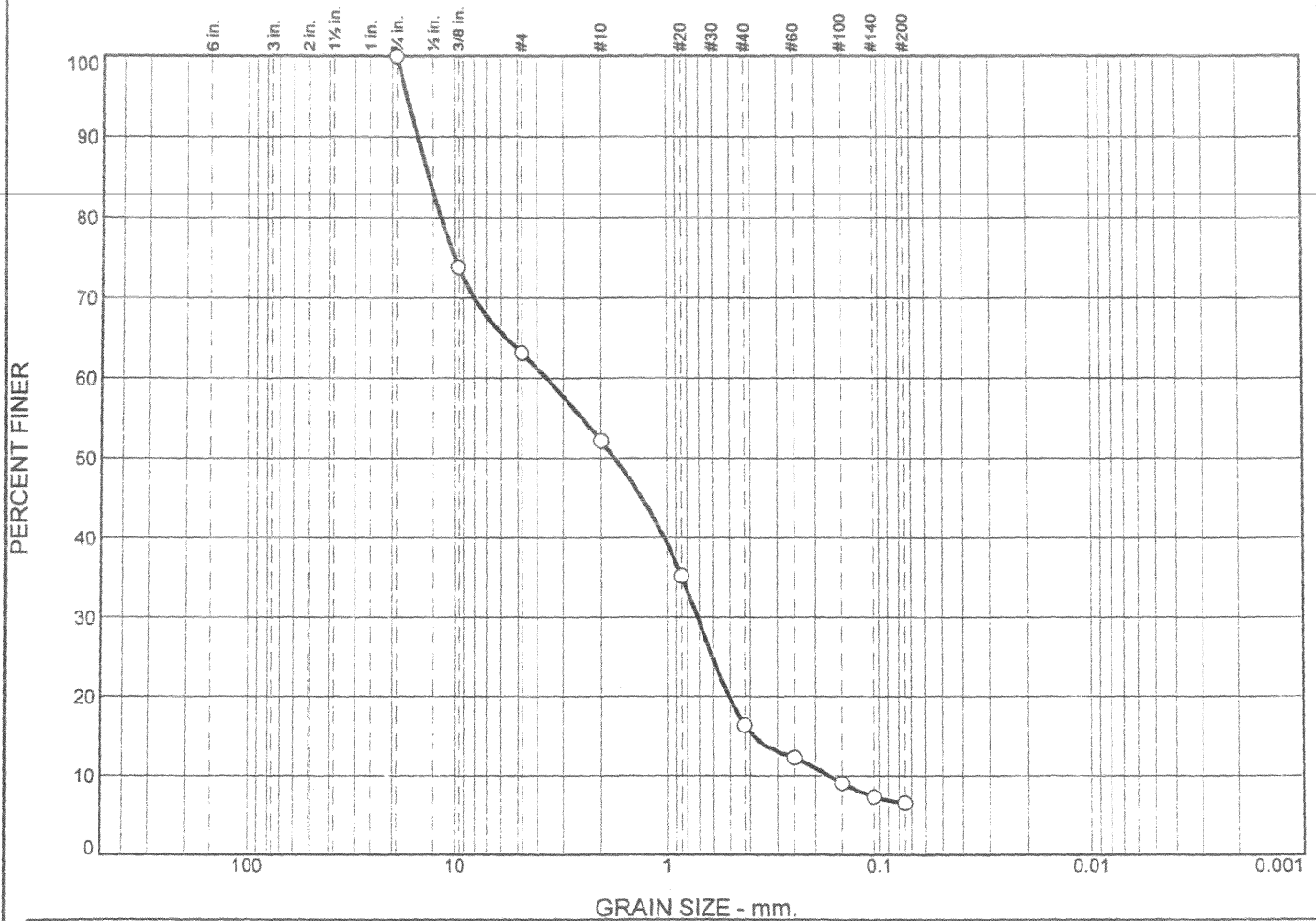
GRAIN SIZE - mm.

Material Description	USCS	AASHTO
○ well graded sand with silt and gravel	SW-SM	

Miami Lakes, FL

Moisture Content % 10.9 CP05-
EAARS-VB-0286

Particle Size Distribution Report



	% +3"		% Gravel		% Sand			% Fines		
			Coarse	Fine	Coarse	Medium	Fine	Silt		Clay
○	0.0		0.0	36.8	11.0	35.9	9.8	6.5		
×	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○			13.3199	3.5918	1.7351	0.7133	0.3870	0.1729	0.82	20.78
Material Description									USCS	AASHTO
○ Poorly graded sand with silt and gravel									SP-SM	

Project No. 05-05-0013- Client: Black & Veatch

Project: E.A.A (Reservoir)W/O#6

Sample Source: CB205

Depth: 105.0'-110.0'

Sample No.: CB205

Remarks:

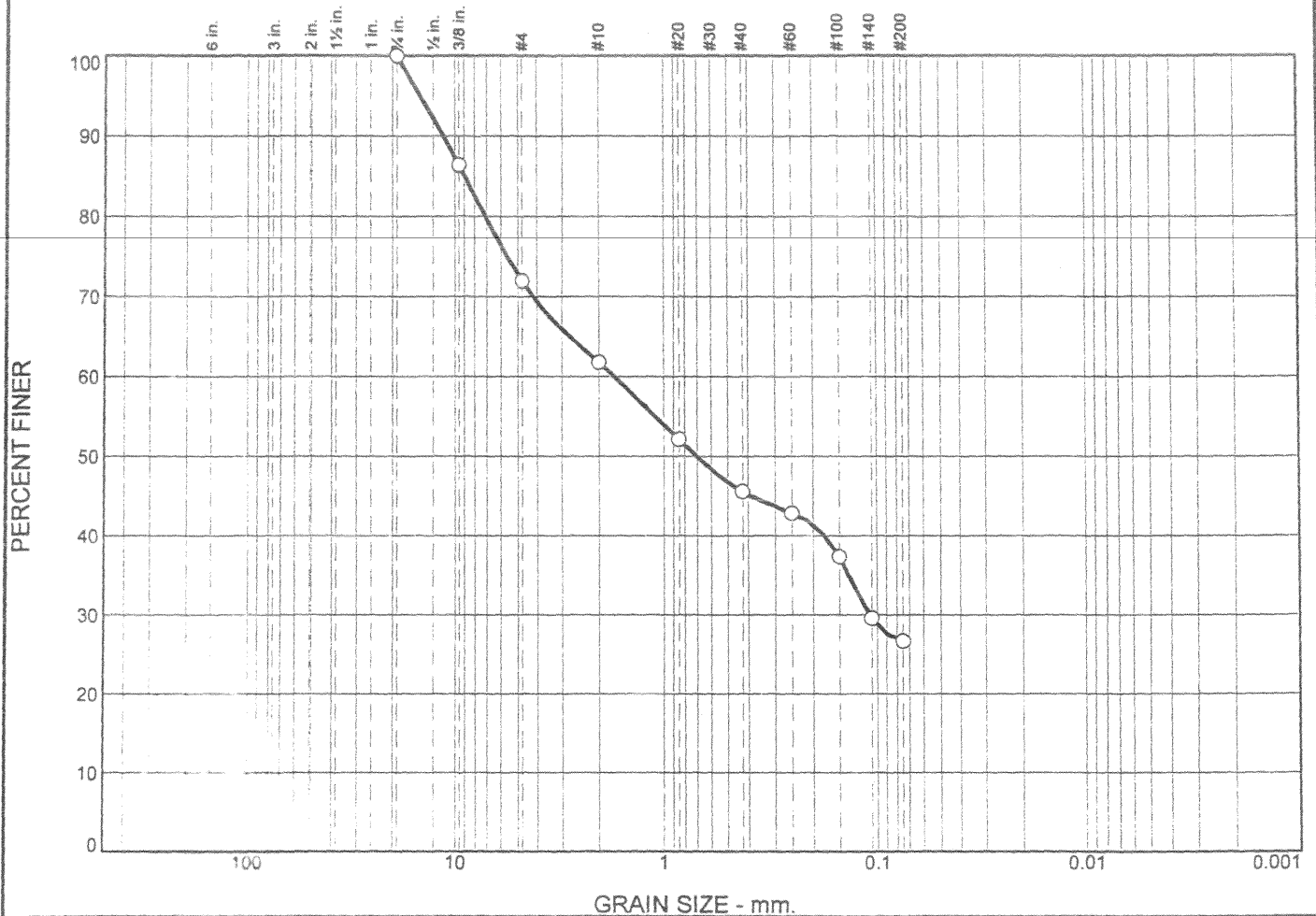
Moisture Content % 13.5 CP05-
EAARS-VB-0286

Nodarse & Associates, Inc.

Miami Lakes, FL

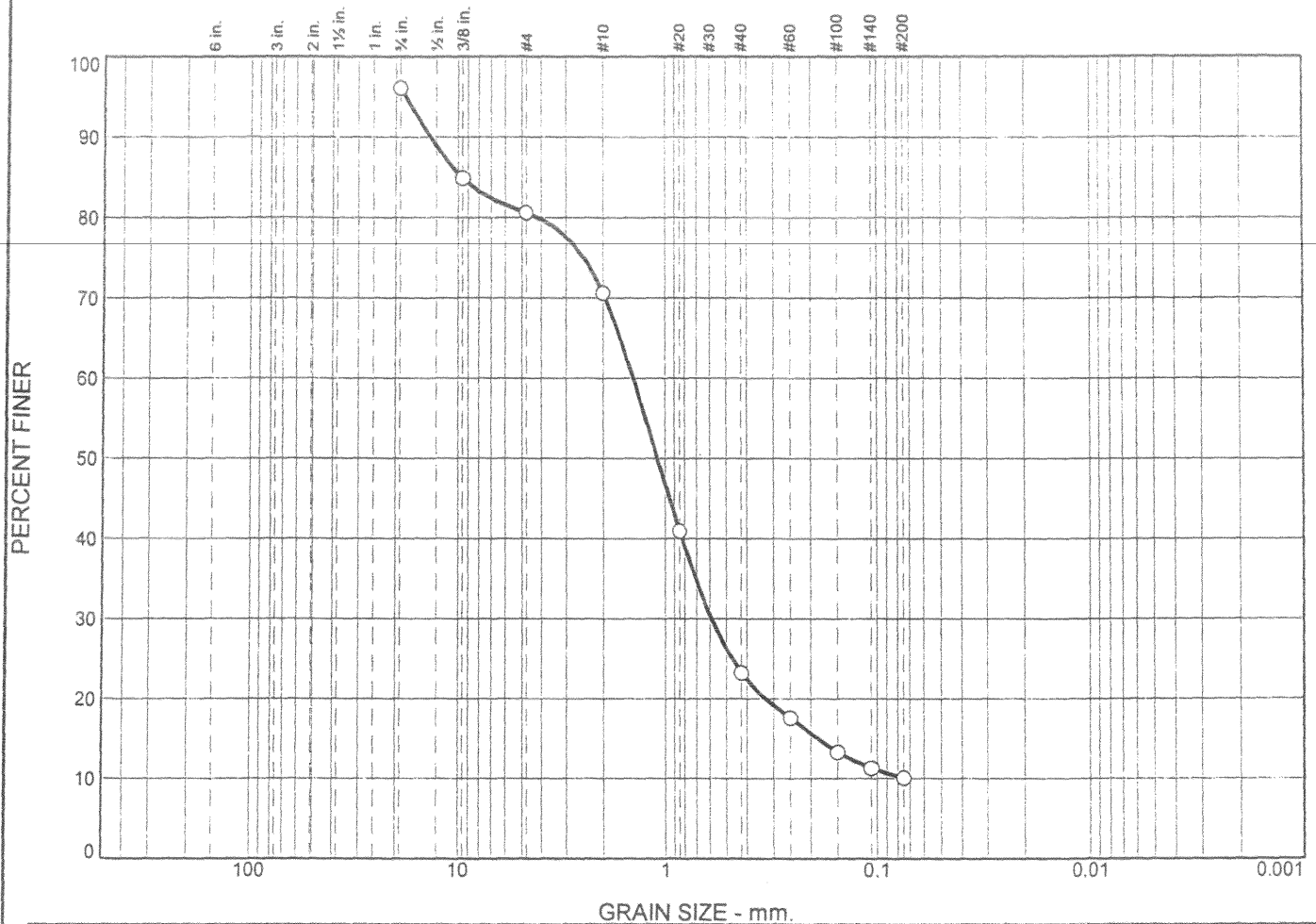
Figure

Particle Size Distribution Report



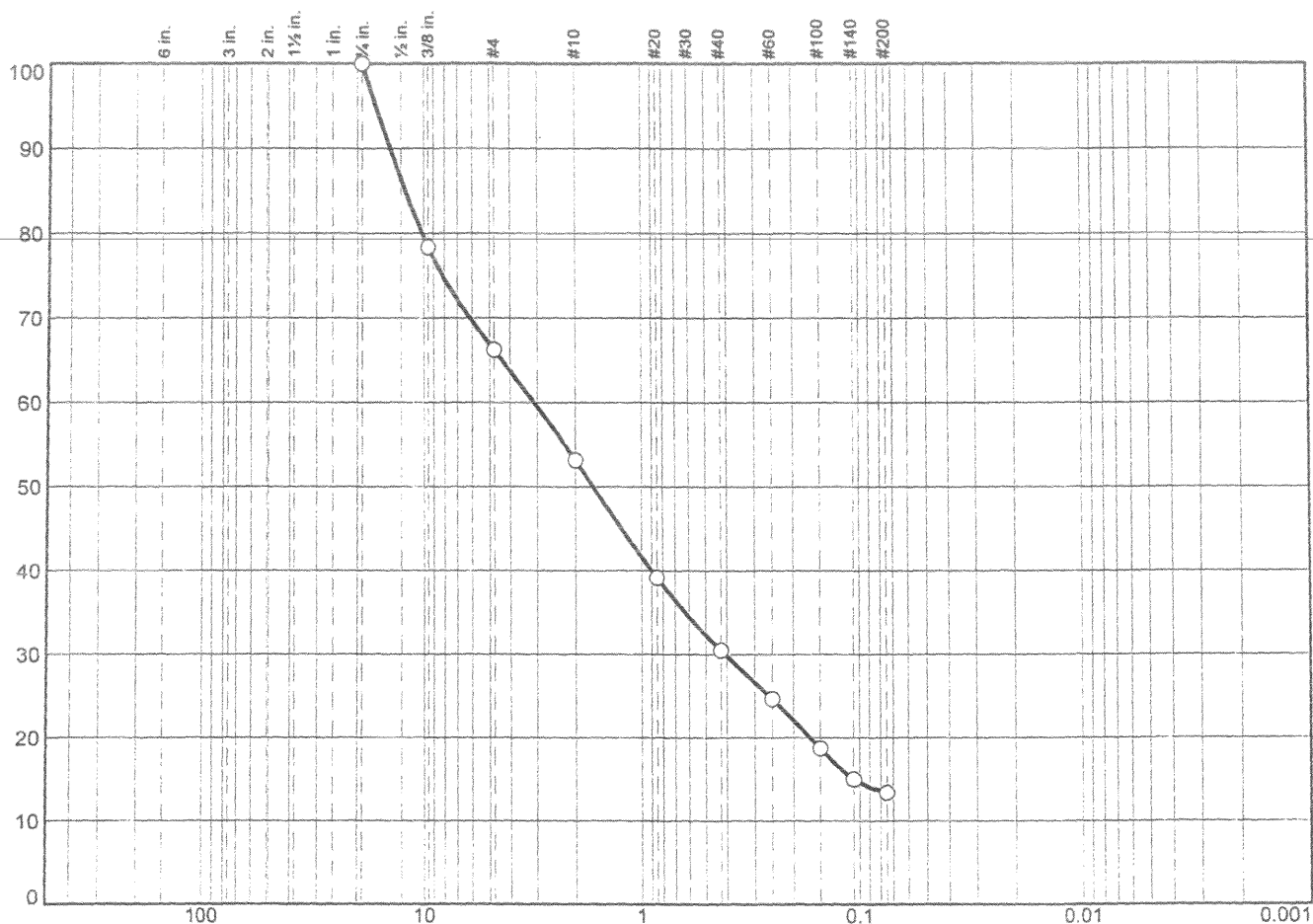
% +3"		% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
<input type="radio"/>	0.0	0.0	28.0	10.2	16.2	18.9	26.7	
<input checked="" type="checkbox"/>	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀
<input type="radio"/>			8.9228	1.6878	0.7005	0.1086		
Material Description							USCS	AASHTO
<input type="radio"/> Silty sand with gravel							SM	
Project No. 05-05-0013- Client: Black & Veatch Project: E.A.A (Reservoir)W/O#6 Sample Source: CB205 Depth: 110.0'-115.0' Sample No.: CB205							Remarks: <input type="radio"/> Moisture Content % 19.8 CP05- EAARS-VB-0286	
Nodarse & Associates, Inc. Miami Lakes, FL							Figure	

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines				
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay			
<input type="radio"/>		15	10	48	13	10				
<input checked="" type="checkbox"/>	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
<input type="radio"/>			9.6337	1.4233	1.0888	0.5903	0.1853			
Material Description								USCS	AASHTO	
<input type="radio"/> Poorly graded sand with silt and gravel								SP-SM		
Project No. 05-05-0013- Client: Black & Veatch Project: E.A.A (Reservoir) <input type="radio"/> Source of Sample: CB-0205 Depth: 115' to 120' Date: <input type="radio"/>								Remarks: <input type="radio"/> Moisture Content % 15.5 CP05-EAARS-VB-0286		
Nodarse & Associates, Inc.										
Miami Lakes, FL								Figure		

PERCENT FINER



GRAIN SIZE - mm.

Material Description

USCS

AASHTO

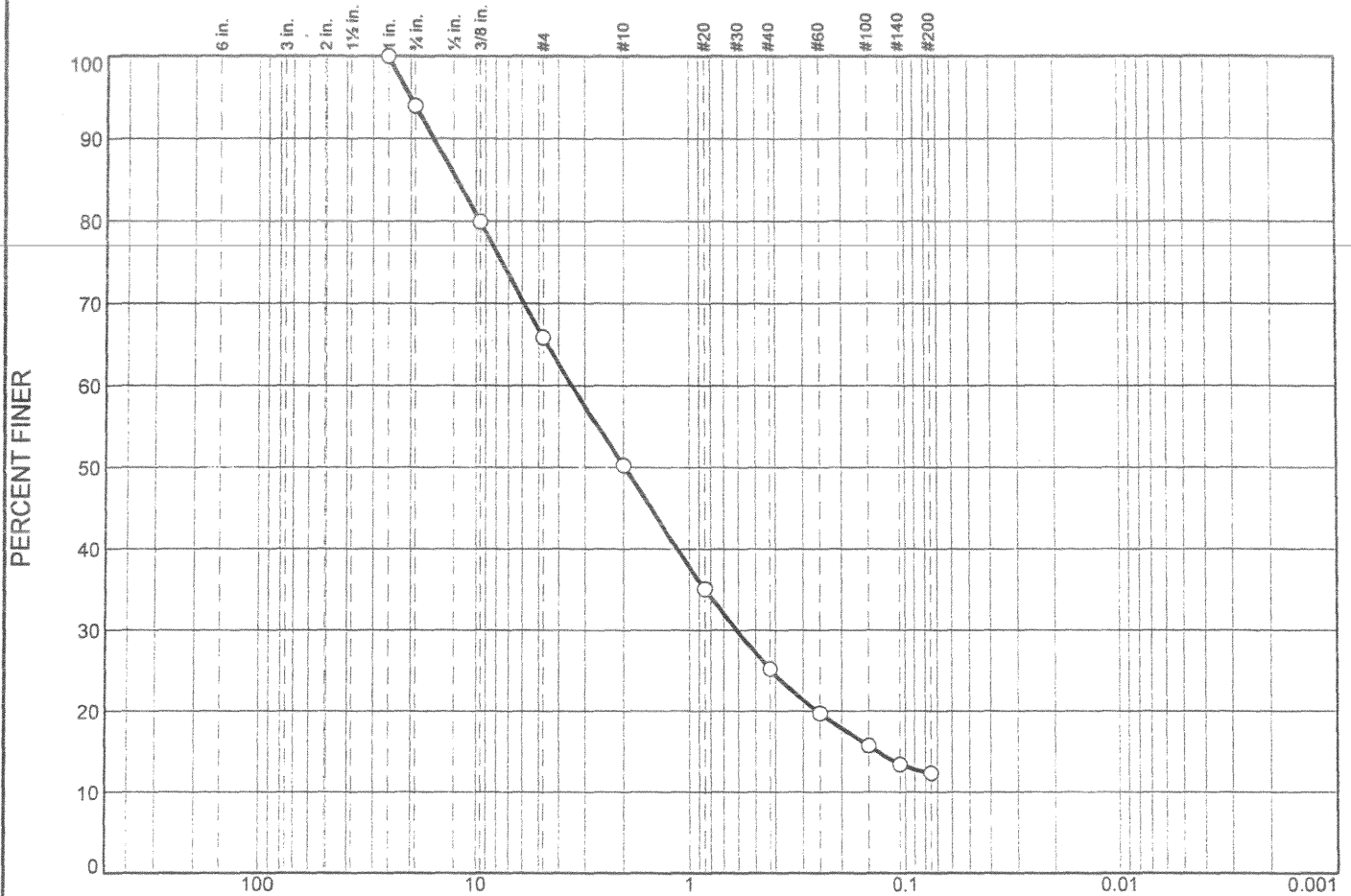
Remarks:

Sample No.: CB205

Miami Lakes, FL

Figure

Particle Size Distribution Report



GRAIN SIZE - mm.

	% +3"		% Gravel		% Sand			% Fines		
			Coarse	Fine	Coarse	Medium	Fine	Silt		Clay
○	0.0		6.0	28.1	15.6	25.1	12.9	12.3		
×	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○			12.2356	3.4620	1.9692	0.6103	0.1357			

Material Description

USCS

AASHTO

○ Poorly graded sand with silt and gravel

SP-SM

Project No. 05-05-0013- Client: Black & Veatch

Project: E.A.A (Reservoir)W/O#6

Remarks:

○ Moisture Content % 16.6 CP05-
EAARS-VB-0286

○ Source of Sample: CB205

Depth: 125'-130.0'

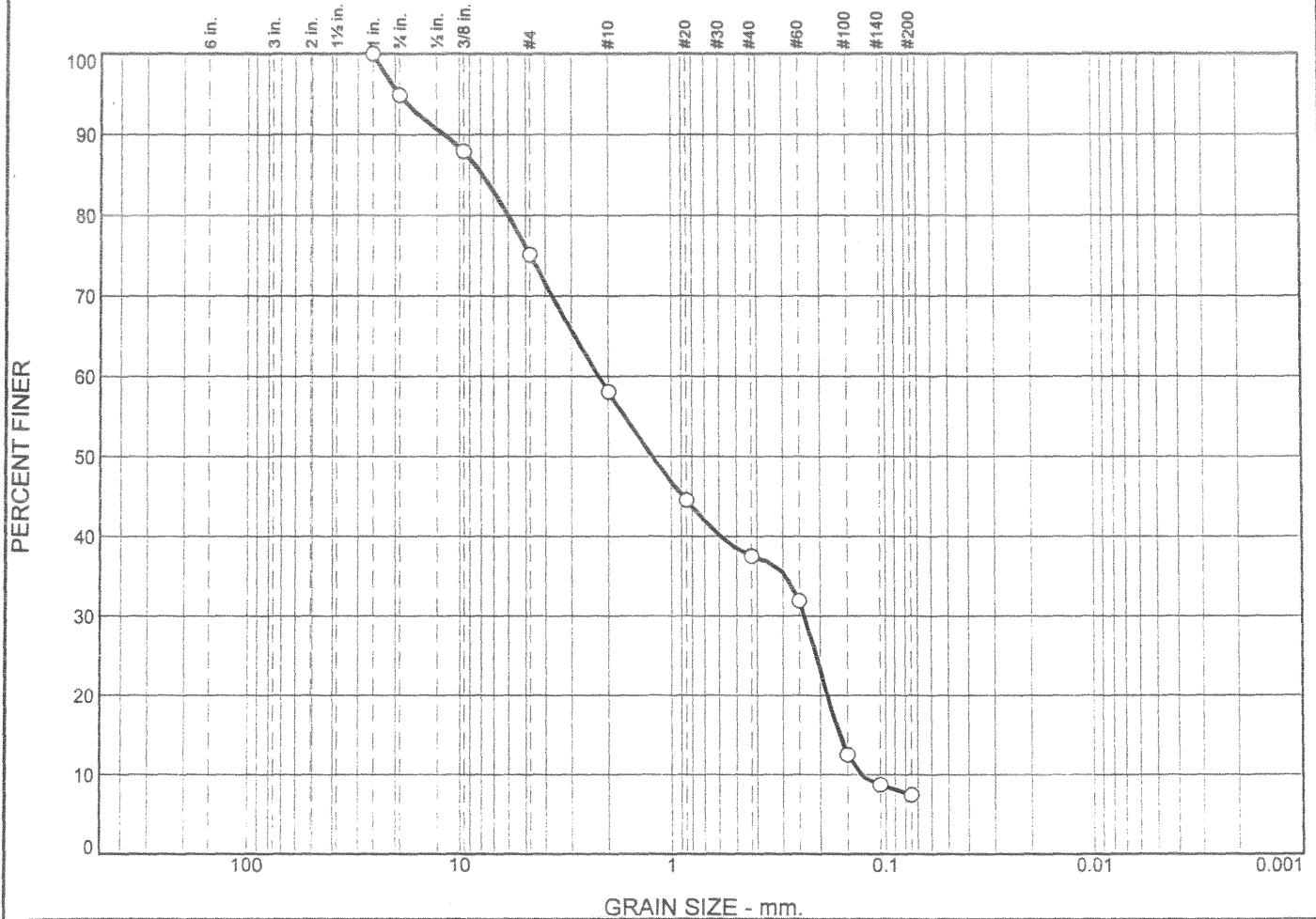
Sample Number: CB205

Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Particle Size Distribution Report



GRAIN SIZE - mm.										
% +3"			% Gravel		% Sand			% Fines		
			Coarse	Fine	Coarse	Medium	Fine	Silt		Clay
○	0.0		5.1	19.7	17.1	20.6	30.0	7.5		
×	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○			7.8082	2.2231	1.2327	0.2356	0.1627	0.1304	0.19	17.05
Material Description								USCS	AASHTO	
○ Poorly graded sand with silt and gravel								SP-SM		

Project No. 05-05-0013- Client: Black & Veatch

Project: E.A.A (Reservoir)W/O#6

○ Sample Source: CB205

Depth: 140.0'-145.0'

Sample No.: CB205

Remarks:

○ Moisture Content % 15.0 CP05-
EAARS-VB-0286

Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Grain size distribution curve showing Percent Finer (Y-axis, 0 to 100) versus Grain Size in mm (X-axis, logarithmic scale from 100 to 0.001). The curve represents the cumulative percentage of soil passing through various sieves.

Grain Size (mm)	Sieve Size	Percent Finer (%)
4.75	No. 40	100
2.50	No. 60	95
1.18	No. 125	85
0.85	No. 175	70
0.60	No. 250	53
0.425	No. 35	36
0.30	No. 60	26
0.25	No. 75	21
0.15	No. 100	13
0.106	No. 140	11
0.075	No. 200	10

		% Gravel		% Sand			% Fines			
% +3"		Coarse	Fine	Coarse	Medium	Fine	Silt		Clay	
○			25	17	27	16	10			
×	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○			9.9537	2.8667	1.7431	0.6109	0.1716			
Material Description								USCS	AASHTO	
○ Poorly graded sand with silt and gravel								SP-SM		

Project No. 05-05-0013-	Client: Black & Veatch	Remarks: ○ Moisture Content % 14.1 CP05-EAARS-VB-0286
Project: E.A.A (Reservoir)		
○ Source of Sample: CB-0205	Depth: 150' to 155'	
Date: ○		
Nodarse & Associates, Inc.		Figure
Miami Lakes, FL		

The graph illustrates the grain size distribution of a material. The y-axis represents the percentage of material finer than a given grain size, ranging from 0 to 100. The x-axis represents the grain size in millimeters on a logarithmic scale, ranging from 100 mm to 0.001 mm. The curve shows that approximately 100% of the material is finer than 100 mm, and about 12% is finer than 0.075 mm (No. 200 sieve).

Grain Size (mm)	Percent Finer (%)
100	100
75	100
60	100
40	100
30	100
20	100
15	100
10	100
7.5	98
6	95
4.75	81
3.75	70
3.0	60
2.5	50
2.0	44
1.5	42
1.18	40
0.85	20
0.60	13
0.425	12

Project No. 05-05-0013- Client: Black & Veatch Project: E.A.A (Reservoir)W/O#6 ○ Sample Source: CB205 Depth: 1565.0'-160.0' Sample No.: CB205	Remarks: ○ Moisture Content % 13.34 CP05-EAARS-VB-0286
<p align="center">Nodarse & Associates, Inc.</p> <p align="center">Miami Lakes, FL</p>	

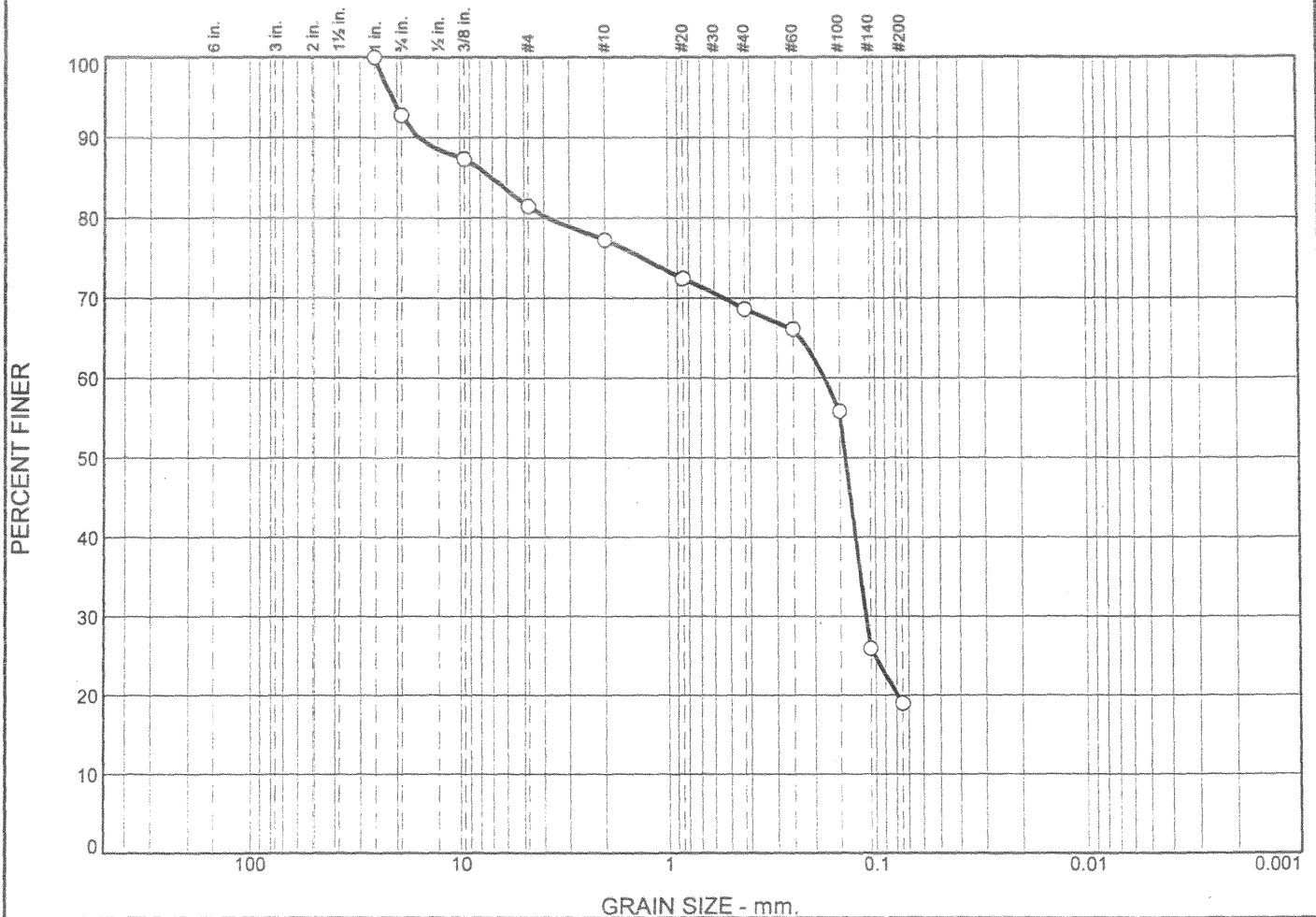
PERCENT FINER

SIEVE SIZE

Sieve Size	Percent Finer (%)
6 in.	100
3 in.	100
2 in.	100
1½ in.	100
¾ in.	100
½ in.	95
3/8 in.	86
#4	74
#10	58
#20	46
#30	40
#40	35
#60	24
#100	15
#140	12
#200	12

Project No. 05-05-0013- Client: Black & Veatch Project: E.A.A (Reservoir)W/O#6 ○ Sample Source: CB205 Depth: 160.0'-165.0' Sample No.: CB205	Remarks: ○ Moisture Content % 20.0 CP05- EAARS-VB-0286
<p style="text-align: center;">Nodarse & Associates, Inc.</p> <p style="text-align: center;">Miami Lakes, FL</p>	

Particle Size Distribution Report



GRAIN SIZE - mm.											
% +3"		% Gravel		% Sand			% Fines				
		Coarse	Fine	Coarse	Medium	Fine	Silt		Clay		
<input type="radio"/>	0.0		7.2	11.3	4.2	8.6	49.7	19.0			
<input checked="" type="checkbox"/>	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u	
<input type="radio"/>			7.0278	0.1770	0.1395	0.1122					
Material Description								USCS	AASHTO		
<input type="radio"/> Silty sand with gravel								SM			

Project No. 05-05-0013- Client: Black & Veatch

Project: E.A.A (Reservoir)W/O#6

☐ Sample Source: CB205

Depth: 175.0'-180.0'

Sample No.: CB205

Remarks:

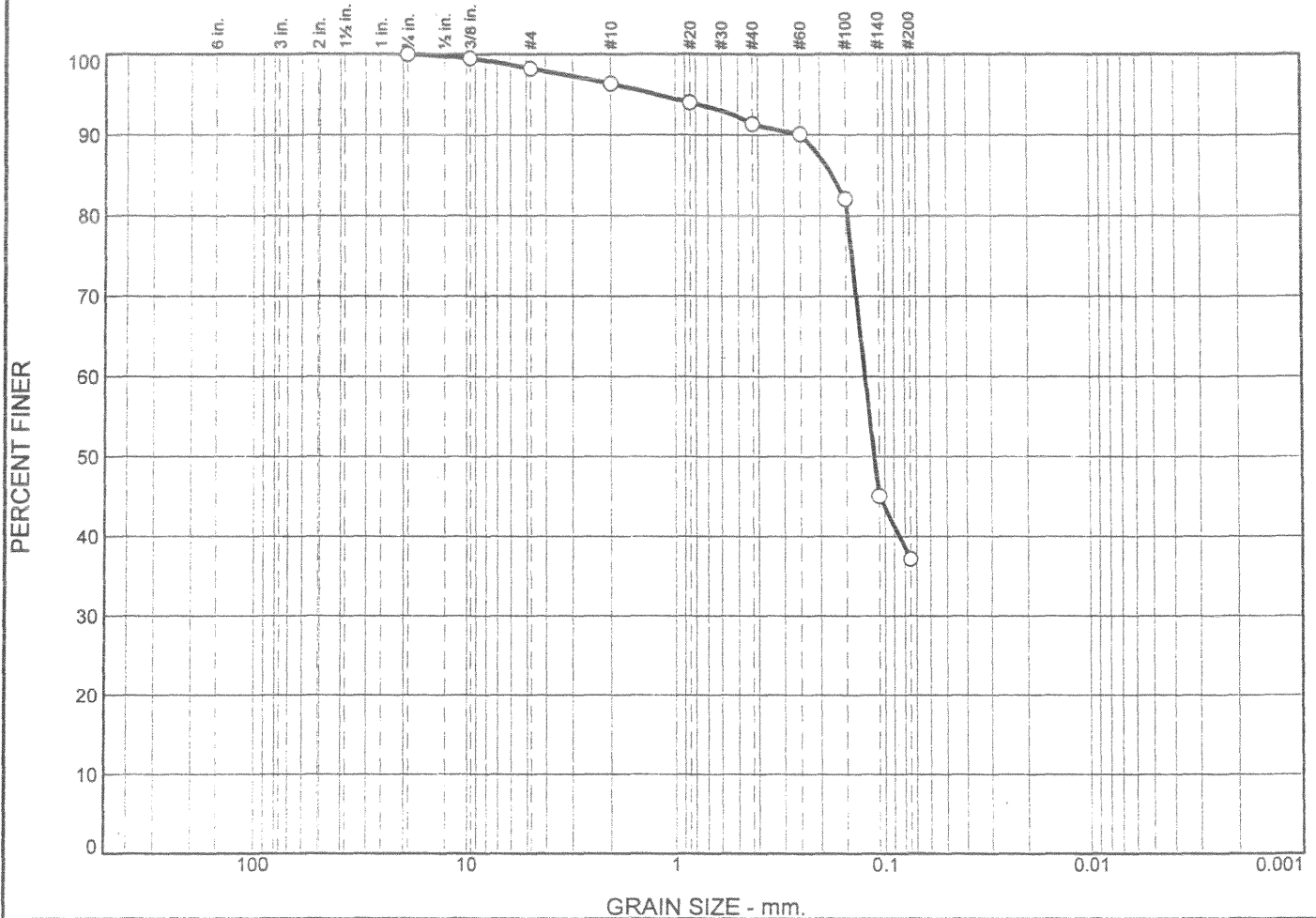
☐ Moisture Content % 18.3 CP05-
EAARS-VB-0286

Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Particle Size Distribution Report



GRAIN SIZE - mm.										
% +3"		% Gravel		% Sand			% Fines			
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay		
○	0.0	0.0	1.8	1.9	4.9	54.2	37.2			
⊗	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○			0.1731	0.1227	0.1120					

Material Description							USCS	AASHTO
Silty sand							SM	

Project No. 05-05-0013- Client: Black & Veatch
 Project: E.A.A (Reservoir)W/O#6

Sample Source: CB205 Depth: 180.0'-185.0' Sample No.: CB205

Nodarse & Associates, Inc.

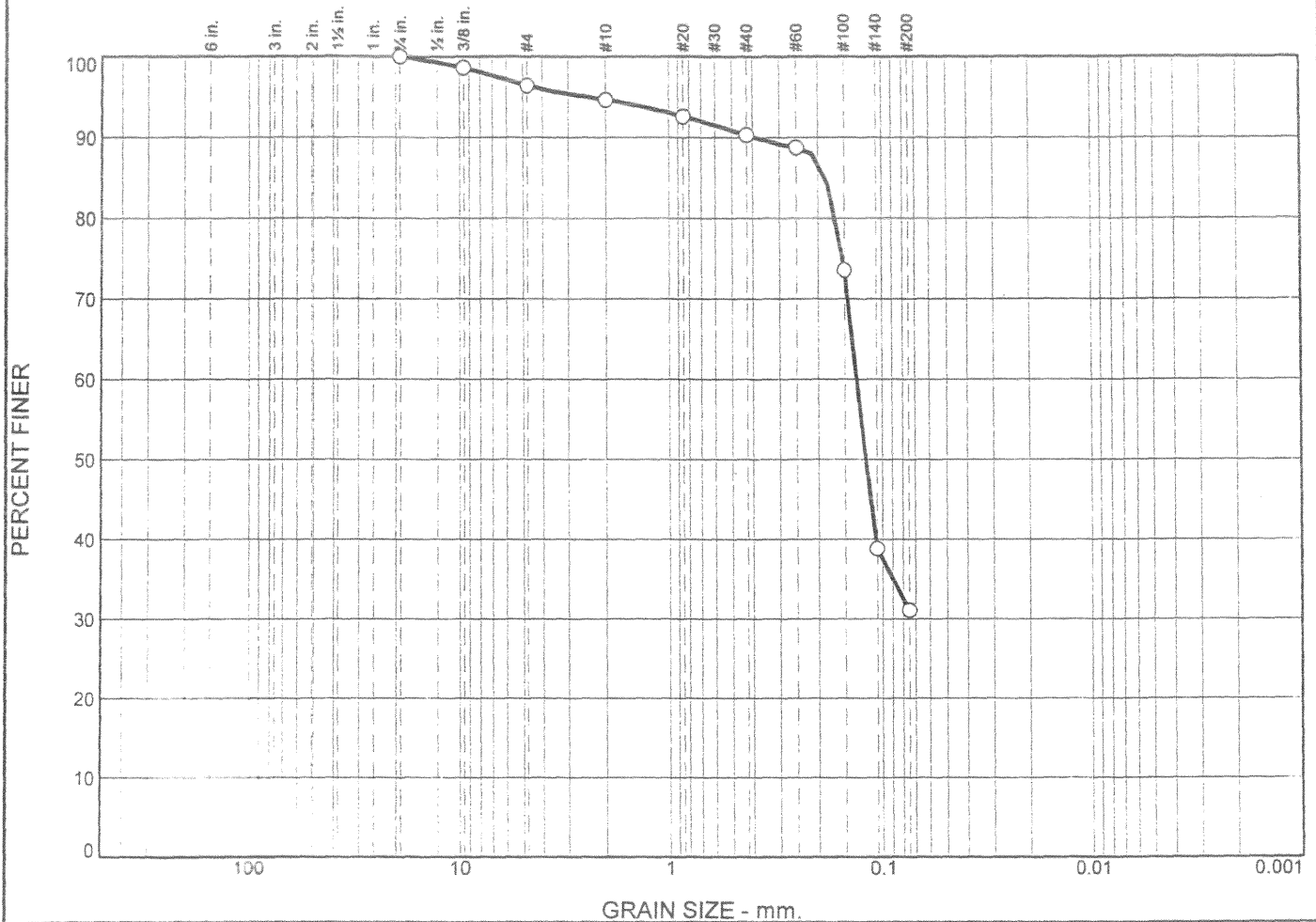
Miami Lakes, FL

Remarks:

Moisture Content % 20.7 CP05-
 EAARS-VB-0286

Figure

Particle Size Distribution Report



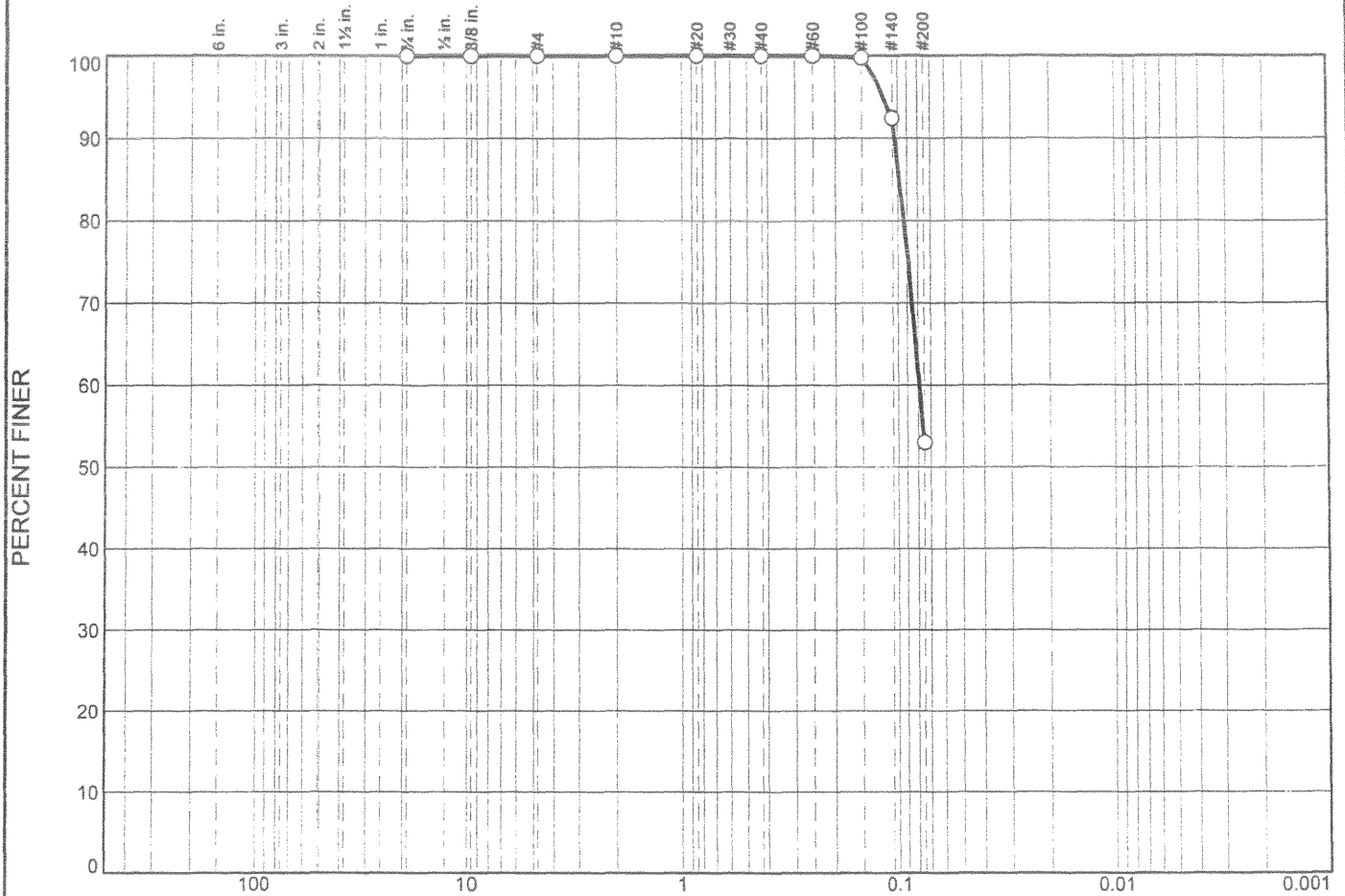
GRAIN SIZE - mm.										
% +3"		% Gravel		% Sand			% Fines			
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay		
○	0.0	0.0	3.6	1.7	4.4	59.2	31.1			
×	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○			0.1832	0.1312	0.1198					

Material Description							USCS	AASHTO
○ Silty sand							SM	

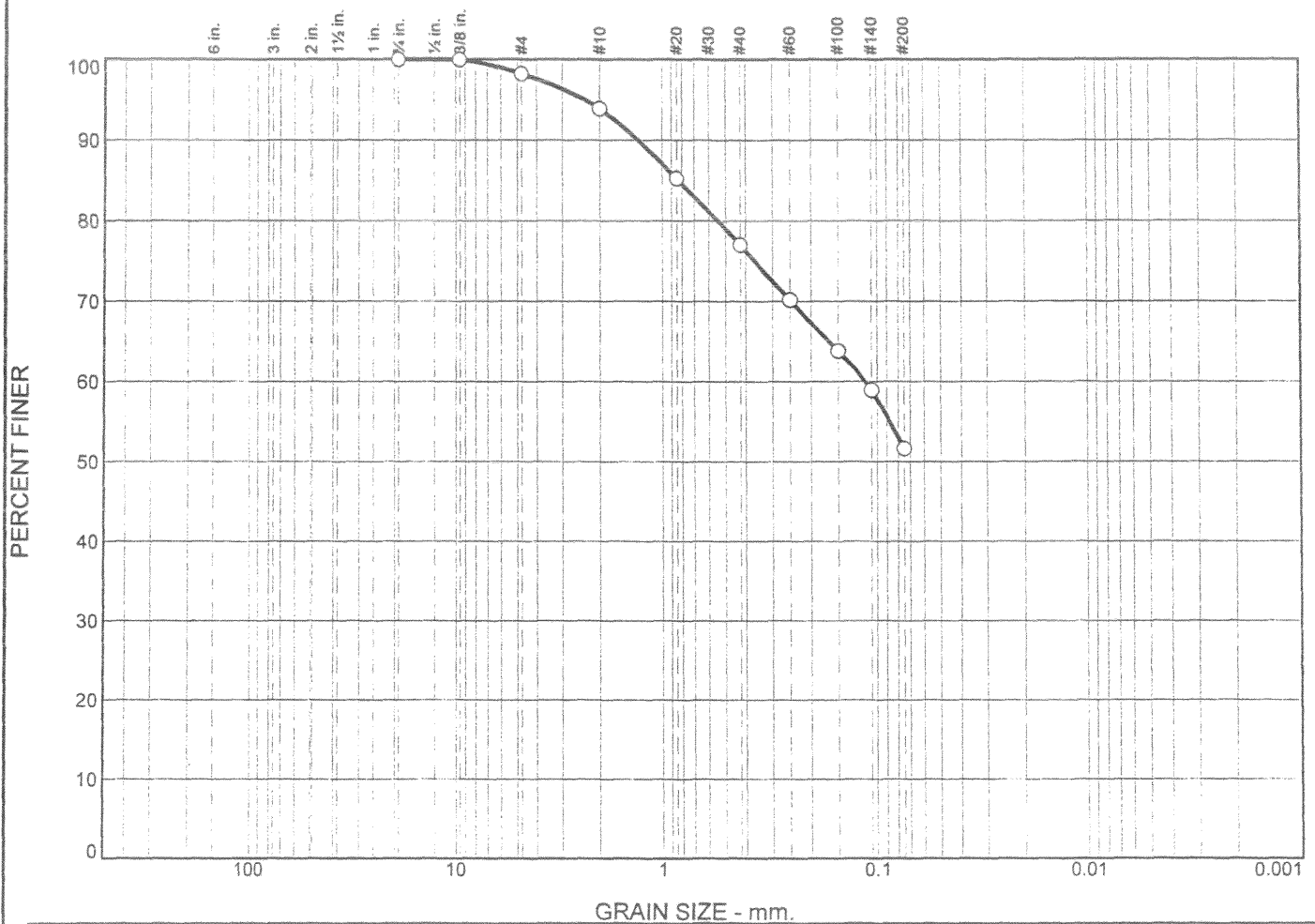
Project No. 05-05-0013- Client: Black & Veatch Project: E.A.A. (Reservoir)W/O#6 ○ Sample Source: CB205 Depth: 195.0'-200.0' Sample No.: CB205	Remarks: ○ Moisture Content % 18.5 CP05- EAARS-VB-0286
Nodarse & Associates, Inc. Miami Lakes, FL	

Figure

Particle Size Distribution Report



Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines		
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	
○	0.0	0.0	1.8	4.3	16.9	25.3	51.7		
×	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c
○			0.8308	0.1129					
Material Description							USCS	AASHTO	
○ Inorganic silts and very fine sands							ML		

Project No. 05-05-0013- Client: Black & Veatch
 Project: E.A.A (Reservoir)W/O#6

○ Source of Sample: CB219 Depth: 14.0'-15.5 Sample Number: CB219

Nodarse & Associates, Inc.

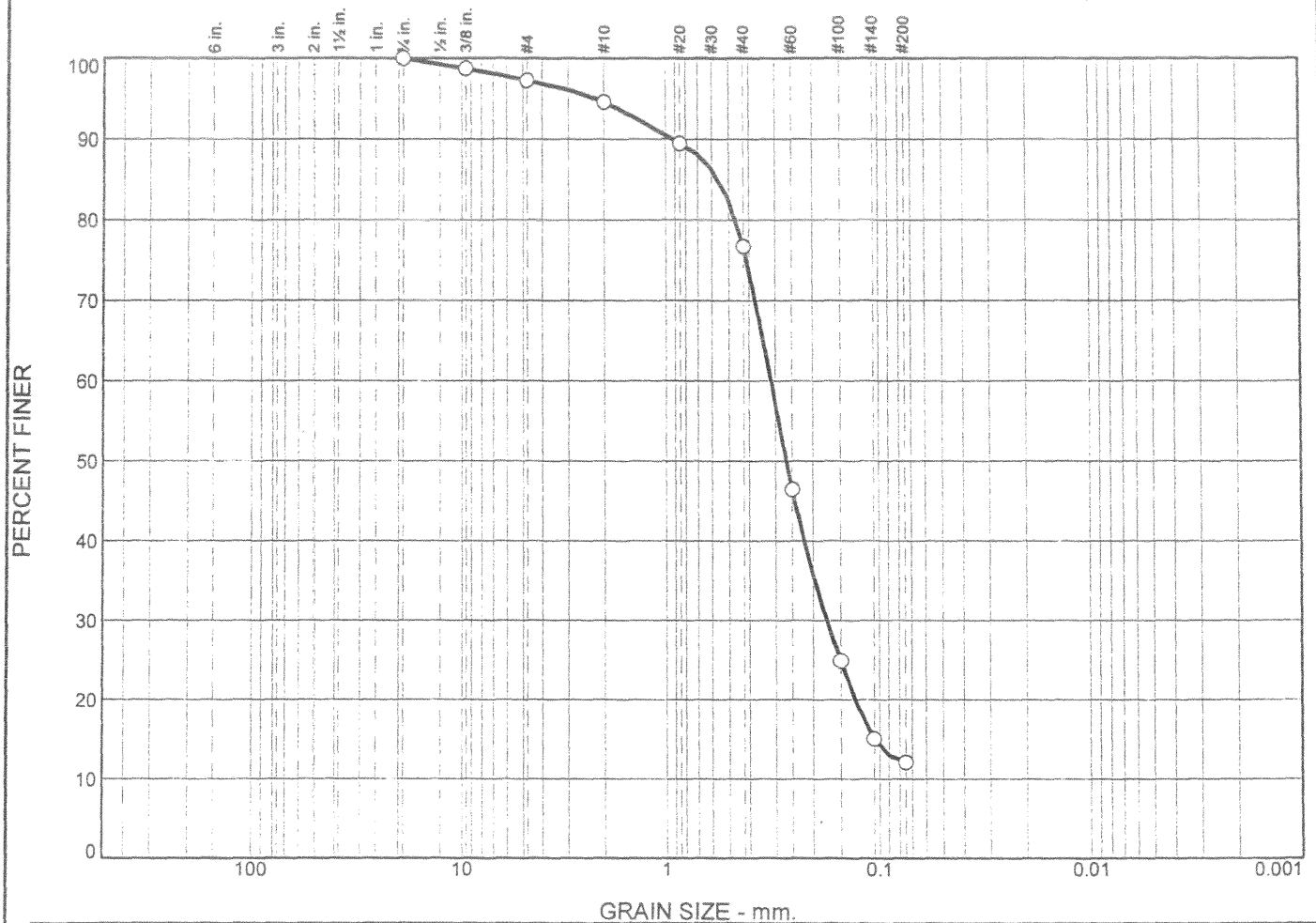
Miami Lakes, FL

Remarks:

○ Moisture Content %22.8 CP05-
 EAARS-CB-0317

Figure

Particle Size Distribution Report



GRAIN SIZE - mm.										
% +3"		% Gravel		% Sand			% Fines			
		Coarse	Fine	Coarse	Medium	Fine	Silt		Clay	
○	0.0	0.0	2.7	2.7	17.9	64.6	12.1			
×	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○			0.5563	0.3138	0.2661	0.1729	0.1057			
Material Description								USCS	AASHTO	
○ Poorly graded sand with silt								SP-SM		

Project No. 05-05-0013- Client: Black & Veatch

Project: E.A.A (Reservoir)W/O#6

○ Source of Sample: CB219

Depth: 34.0'-35.5

Sample Number: CB219

Nodarse & Associates, Inc.

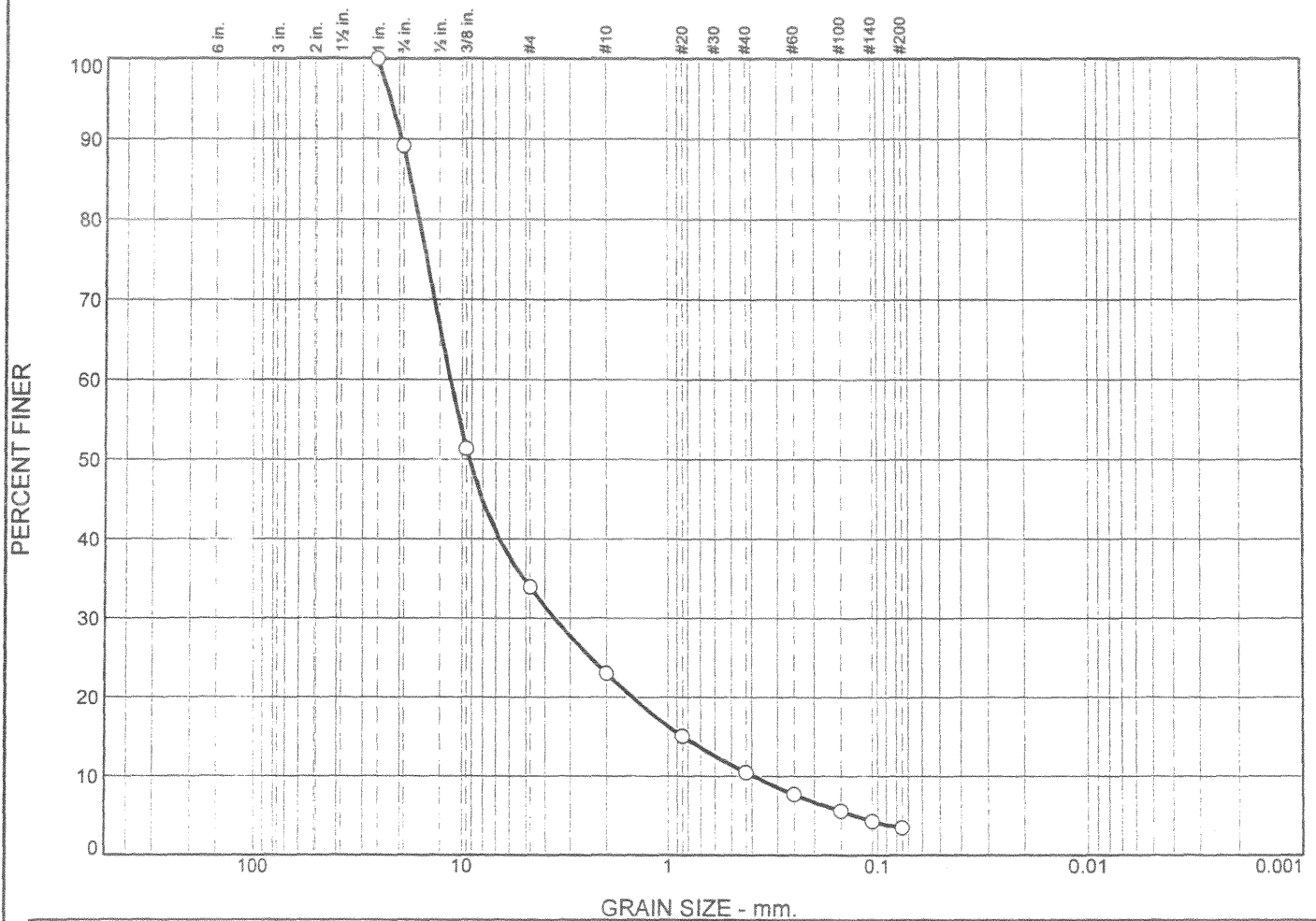
Miami Lakes, FL

Remarks:

○ Moisture Content % 25.4 CP05-
EAARS-CB-0317

Figure

Particle Size Distribution Report



GRAIN SIZE - mm.										
% +3"		% Gravel		% Sand			% Fines			
		Coarse	Fine	Coarse	Medium	Fine	Silt		Clay	
○	0.0	10.8	55.3	10.9	12.5	7.0	3.5			
×	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○			17.4855	11.2897	9.2234	3.5693	0.8428	0.3896	2.90	28.98
Material Description								USCS		AASHTO
○ Poorly graded gravel with sand								GP		

Project No. 05-05-0013- Client: Black & Veatch

Project: E.A.A (Reservoir)W/O#6

○ Source of Sample: CB0228

Depth: 4.0'-5.5'

Sample Number: CB0228

Remarks:

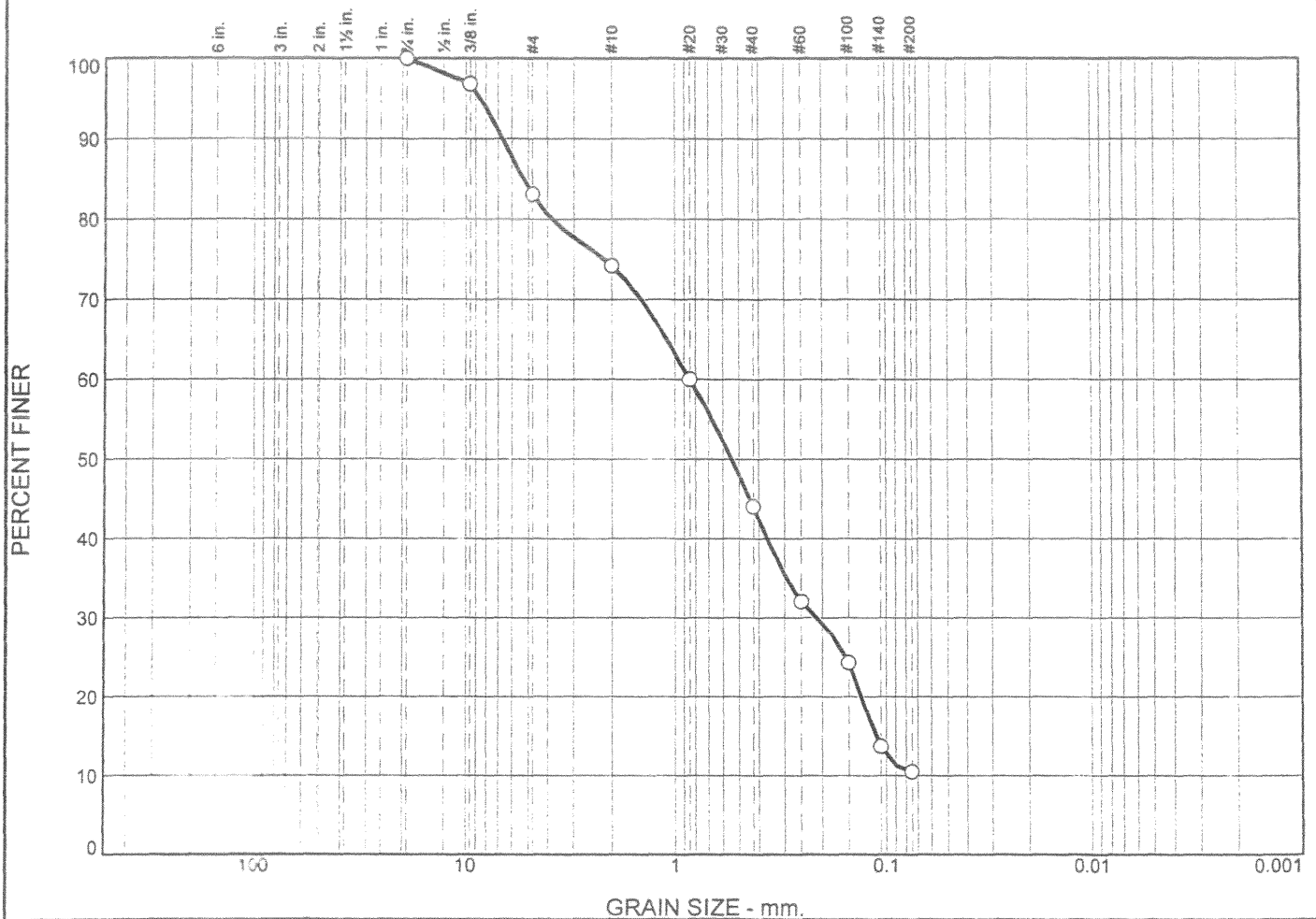
○ Moisture Content % 5.2 CP05-
EAARS-CB-0326

Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Particle Size Distribution Report



GRAIN SIZE - mm.										
% +3"		% Gravel		% Sand			% Fines			
		Coarse	Fine	Coarse	Medium	Fine	Silt		Clay	
○	0.0	0.0	16.9	8.9	30.2	33.5	10.5			
×	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○			5.2567	0.8482	0.5416	0.2123	0.1115			
Material Description									USCS	AASHTO
○ Poorly graded sand with silt and gravel									SP-SM	

Project No. 05-05-0013- Client: Black & Veatch
 Project: E.A.A (Reservoir)W/O#6

○ Source of Sample: CB0228 Depth: 14.0'-15.5 Sample Number: CB0228

Nodarse & Associates, Inc.

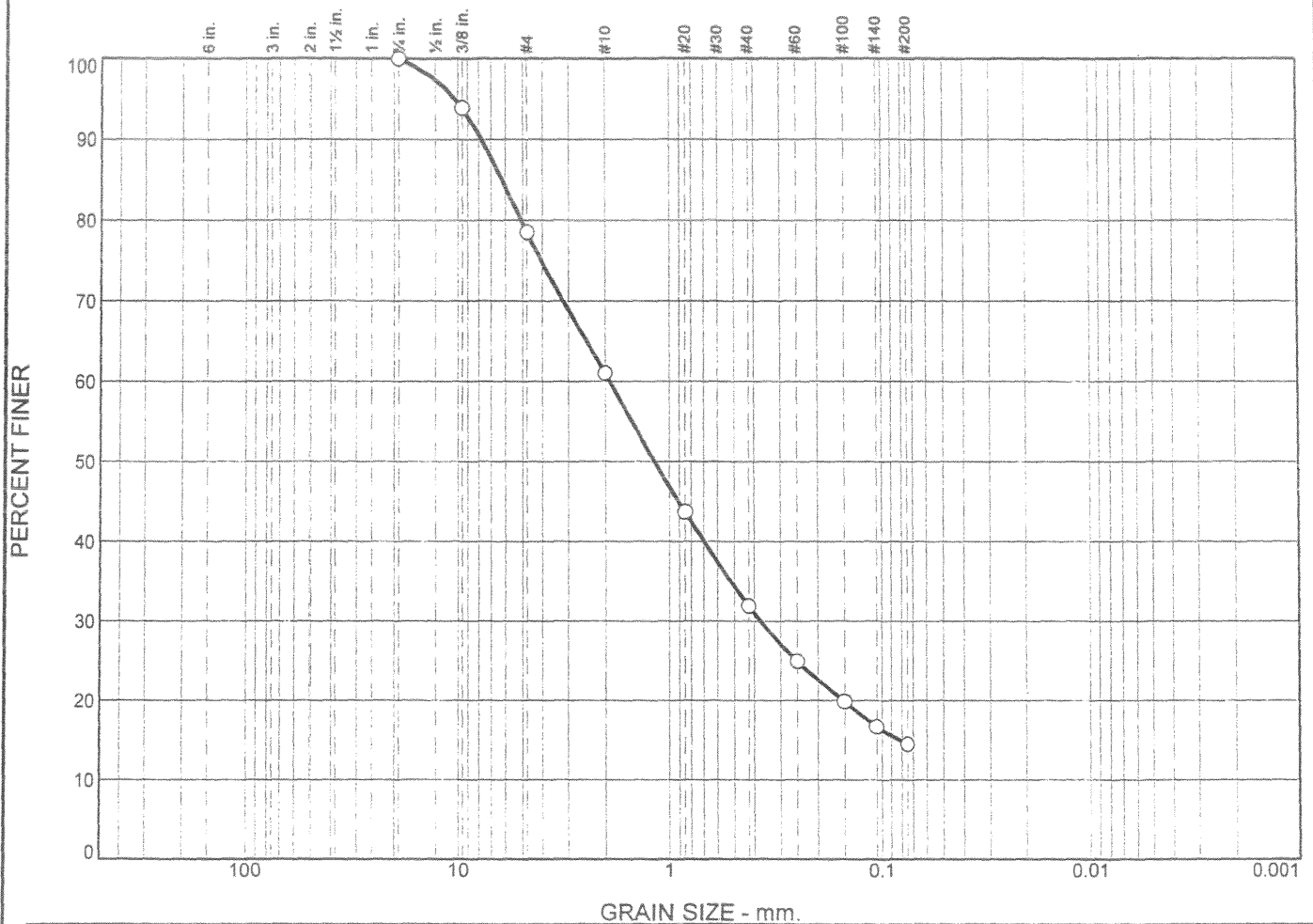
Miami Lakes, FL

Remarks:

○ Moisture Content % 22.6 CP05-
 EAARS-CB-0326

Figure

Particle Size Distribution Report



GRAIN SIZE - mm.											
% +3"		% Gravel		% Sand			% Fines				
		Coarse	Fine	Coarse	Medium	Fine	Silt		Clay		
○	0.0		0.0	21.5	17.5	29.1	17.4	14.5			
×	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u	
○			6.2268	1.8989	1.1658	0.3721	0.0819				
Material Description								USCS	AASHTO		
○ Silty sand with gravel								SM			

Project No. 05-05-0013- Client: Black & Veatch

Project: E.A.A (Reservoir)W/O#6

○ Source of Sample: CB231

Depth: 8.5'-10.0'

Sample Number: CB231

Remarks:

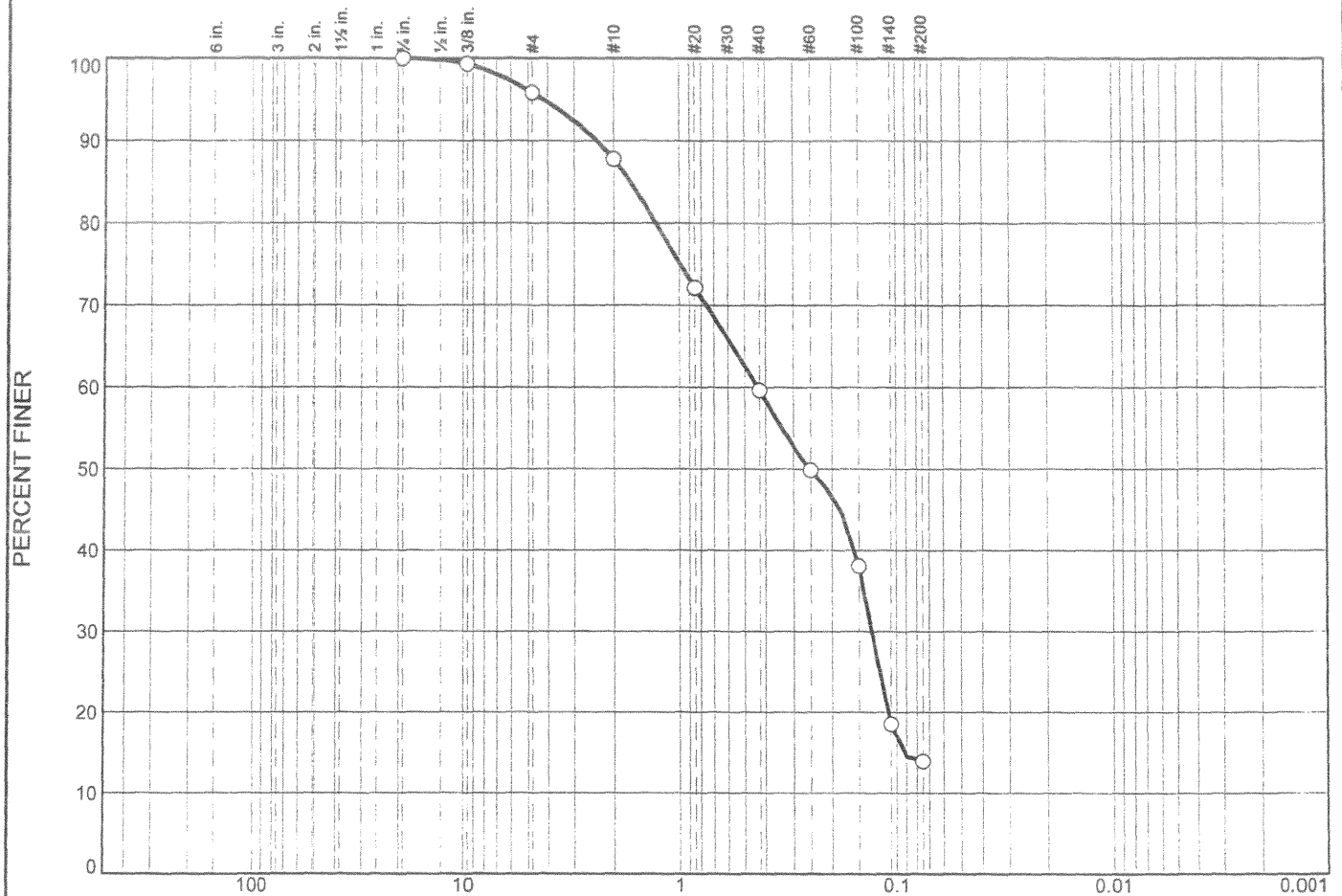
○ Moisture Content % 16.8 CP05-
EAARS-CB-0329

Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Particle Size Distribution Report



GRAIN SIZE - mm.

Grain Size Distribution										
% +3"		% Gravel		% Sand			% Fines			
		Coarse	Fine	Coarse	Medium	Fine	Silt		Clay	
○	0.0	0.0	4.2	8.0	28.1	45.7	14.0			
×	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○			1.6785	0.4322	0.2521	0.1305	0.0926			
Material Description									USCS	AASHTO
○ Poorly graded sand with silt									SP-SM	

Project No. 05-05-0013- Client: Black & Veatch

Project: E.A.A (Reservoir)W/O#6

Source of Sample: CB231

Depth: 13.5'-15.0'

Sample Number: CB231

Remarks:

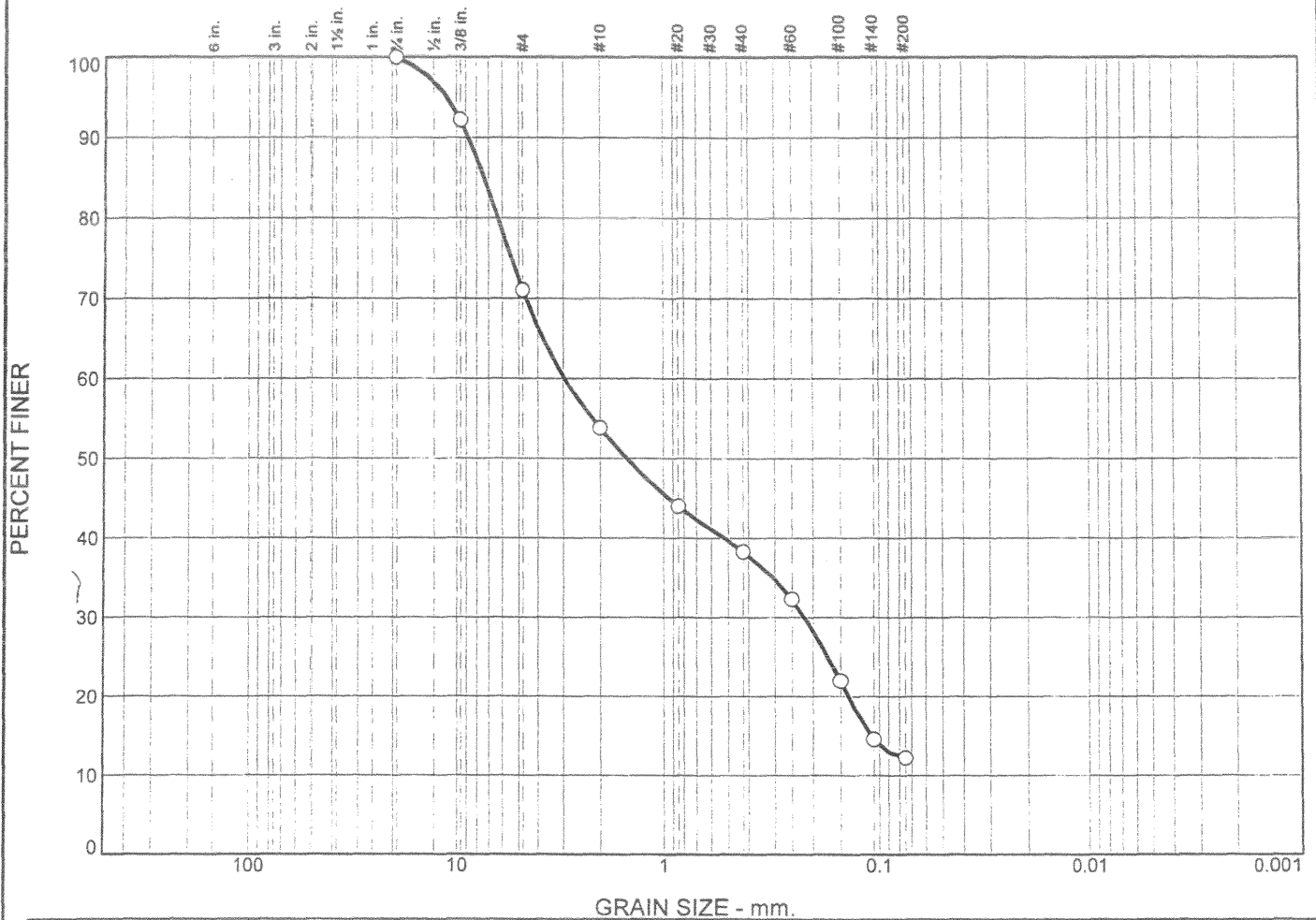
Moisture Content % 22.0 CP05-
EAARS-CB-0329

Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Particle Size Distribution Report



	% +3"		% Gravel		% Sand			% Fines		
			Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	
○	0.0		0.0	28.9	17.3	15.5	26.0	12.3		
×	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○			7.3318	2.9564	1.4925	0.2181	0.1089			

Material Description						USCS	AASHTO
Poorly graded sand with silt and gravel						SP-SM	

Project No. 05-05-0013- Client: Black & Veatch
 Project: E.A.A (Reservoir)W/O#6

Source of Sample: CB231 Depth: 18.5'-20.0 Sample Number: CB231

Nodarse & Associates, Inc.

Miami Lakes, FL

Remarks:

Moisture Content % 13.0 CP05-
 EAARS-CB-0329

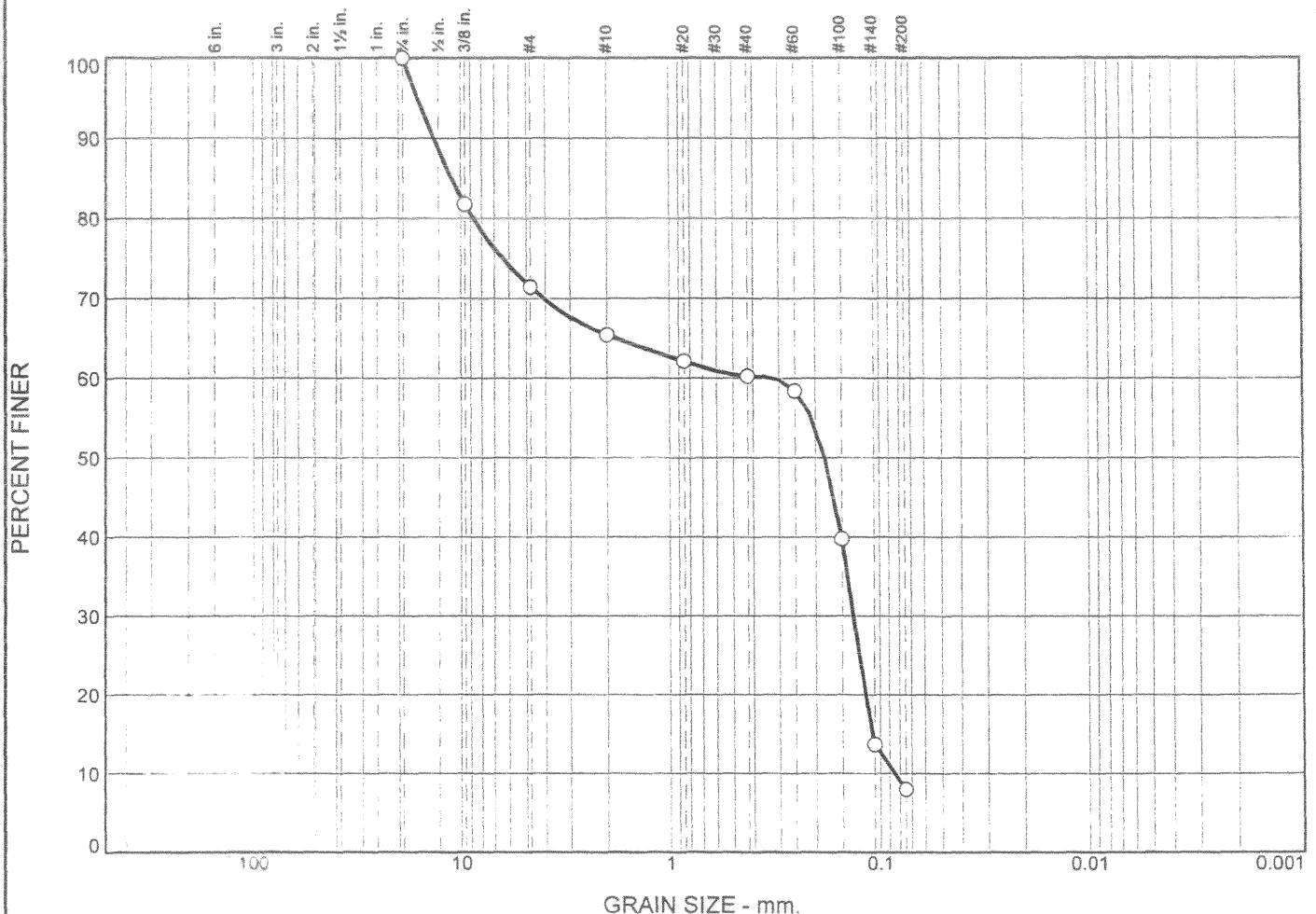
Figure

Grain size distribution curve for a soil sample. The graph plots Percent Finer (0-100) against Grain Size in mm (log scale, 100 to 0.001). The curve shows a well-graded soil with a maximum grain size of approximately 100 mm and a minimum grain size of approximately 0.075 mm.

Grain Size (mm)	Percent Finer (%)
100	100
75	100
60	100
47.5	100
37.5	100
30	100
25	100
20	100
15	100
12.5	100
10	100
7.5	96
6	92
4.75	87
3.75	80
3.0	78
2.5	74
2.0	69
1.5	62
1.18	54
0.85	40
0.75	30
0.60	20
0.425	12
0.30	8
0.25	7
0.20	6
0.15	6
0.125	6
0.106	6
0.075	6

Project No. 05-05-0013- Client: Black & Veatch Project: E.A.A (Reservoir)W/O#6 ○ Source of Sample: CB231 Depth: 23.5'-25.0 Sample Number: CB231	Remarks: ○ Moisture Content % 25.6 CP05- EAARS-CB-0329
<p align="center">Nodarse & Associates, Inc.</p> <p align="center">Miami Lakes, FL</p>	<p align="center">Figure</p>

Particle Size Distribution Report



GRAIN SIZE - mm.										
% +3"		% Gravel		% Sand			% Fines			
		Coarse	Fine	Coarse	Medium	Fine	Silt		Clay	
○	0.0	0.0	28.6	6.0	5.2	52.2	8.0			
×	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○			10.9857	0.3136	0.1797	0.1326	0.1086	0.0846	0.66	3.70
Material Description								USCS	AASHTO	
○ Poorly graded fine sand with silt and gravel								SP-SM		

Project No. 05-05-0013- Client: Black & Veatch

Project: E.A.A (Reservoir)W/O#6

○ Source of Sample: CB231

Depth: 33.5'-35.0

Sample Number: CB231

Nodarse & Associates, Inc.

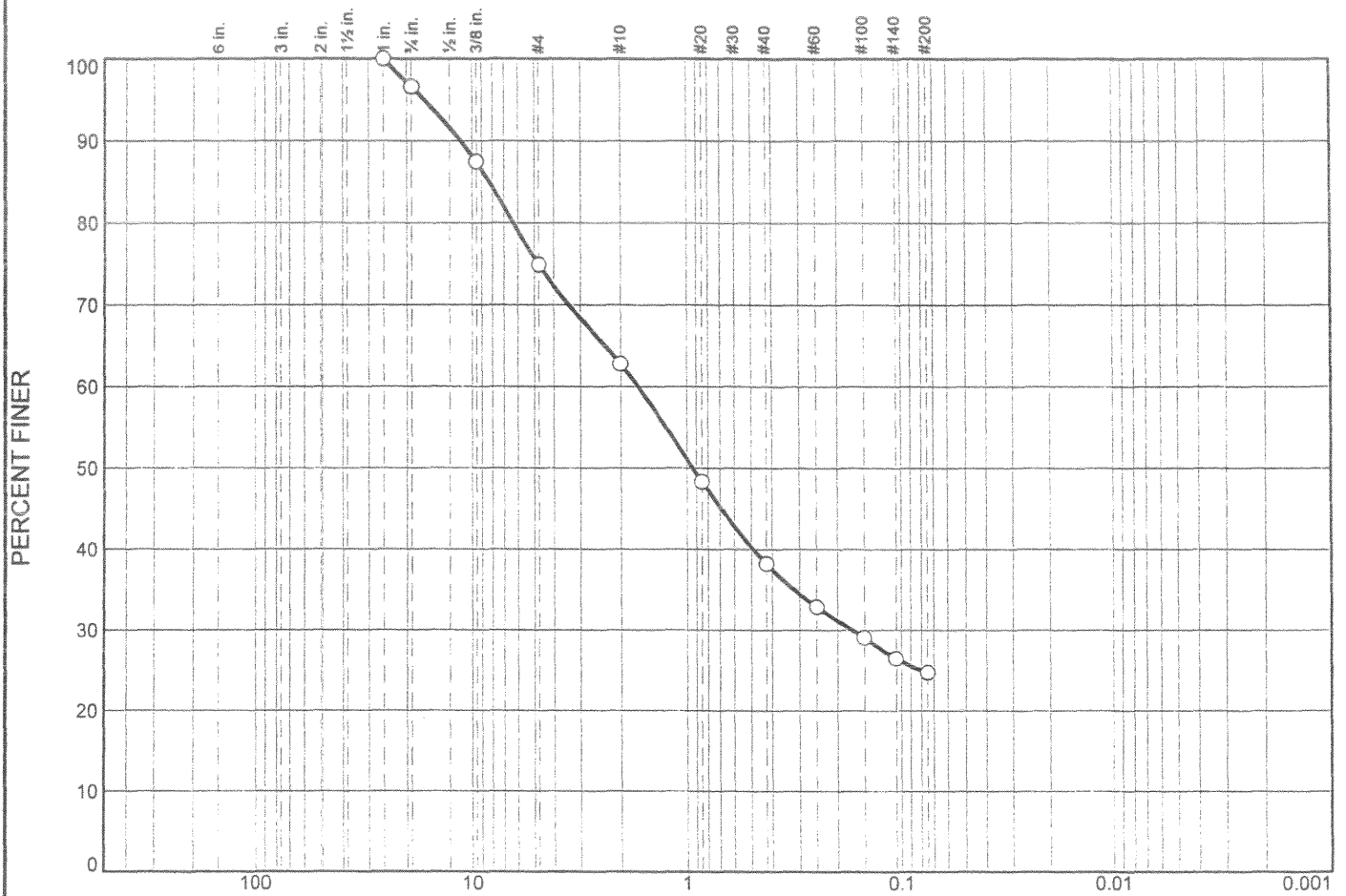
Miami Lakes, FL

Remarks:

○ Moisture Content % 15.7 CP05-
EAARS-CB-0329

Figure

Particle Size Distribution Report



GRAIN SIZE - mm.

GRAVEL SIZE - mm.										
% +3"			% Gravel		% Sand			% Fines		
			Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	
○	0.0		3.4	21.7	12.1	24.6	13.4	24.8		
×	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○			8.2515	1.6704	0.9373	0.1693				
Material Description									USCS	AASHTO
○ Silty sand with gravel									SM	

Project No. 05-05-0013- Client: Black & Veatch

Project: E.A.A (Reservoir)W/O#6

☐ Source of Sample: CB235

Depth: 8.5'-10.0

Sample Number: CB235

Remarks:

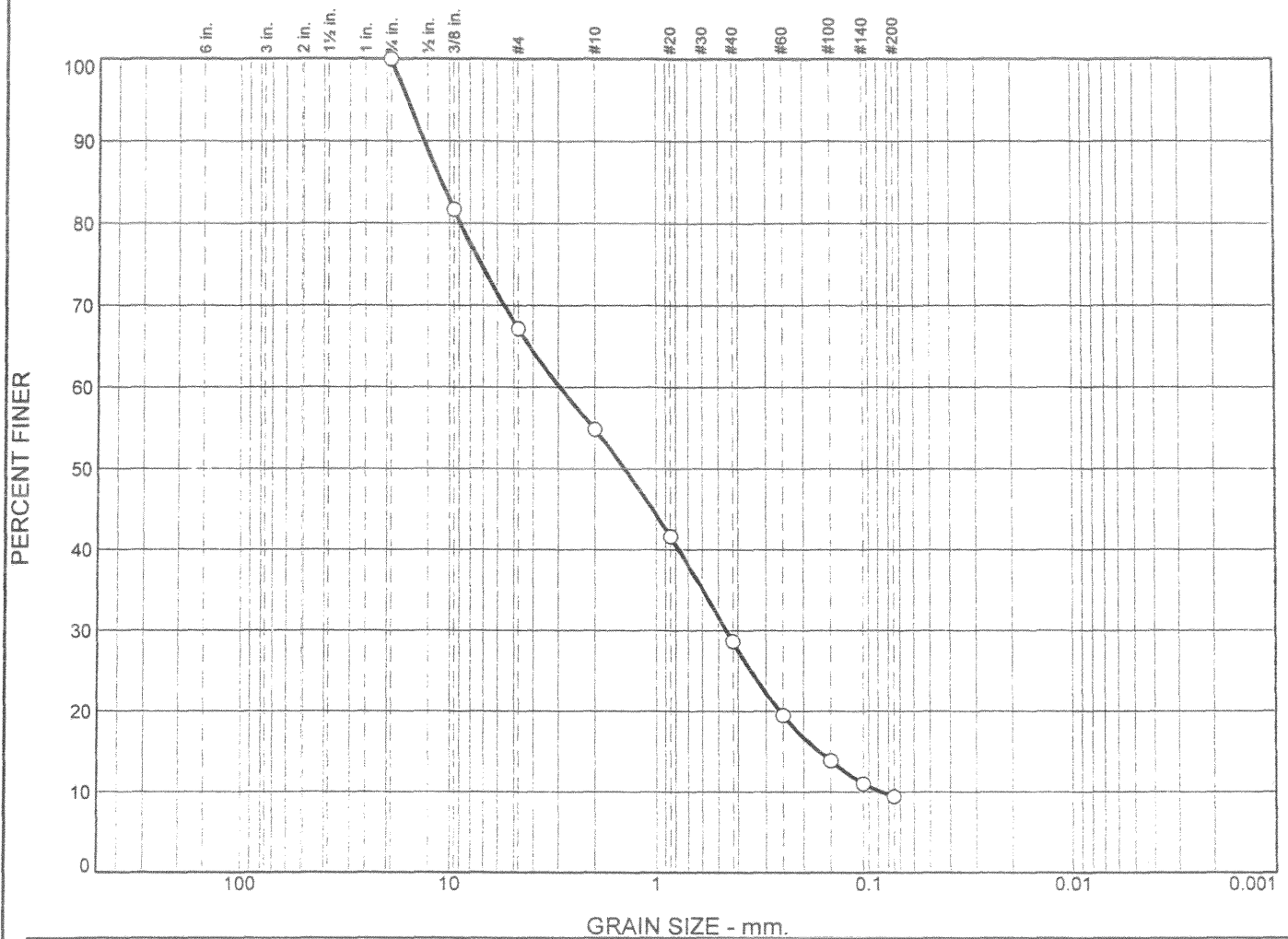
☐ Moisture Content % 24.4 CP05-
EAARS-CB-0333

Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Particle Size Distribution Report



	% +3"		% Gravel		% Sand			% Fines		
			Coarse	Fine	Coarse	Medium	Fine	Silt		Clay
○	0.0		0.0	32.8	12.4	26.1	19.3	9.4		
×	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○			10.8848	2.9453	1.4254	0.4559	0.1689	0.0866	0.81	33.99

Material Description							USCS	AASHTO
○ Poorly graded sand with silt and gravel							SP-SM	

Project No. 05-05-0013- Client: Black & Veatch

Project: E.A.A (Reservoir)W/O#6

○ Source of Sample: CB248

Depth: 10.0'-11.5

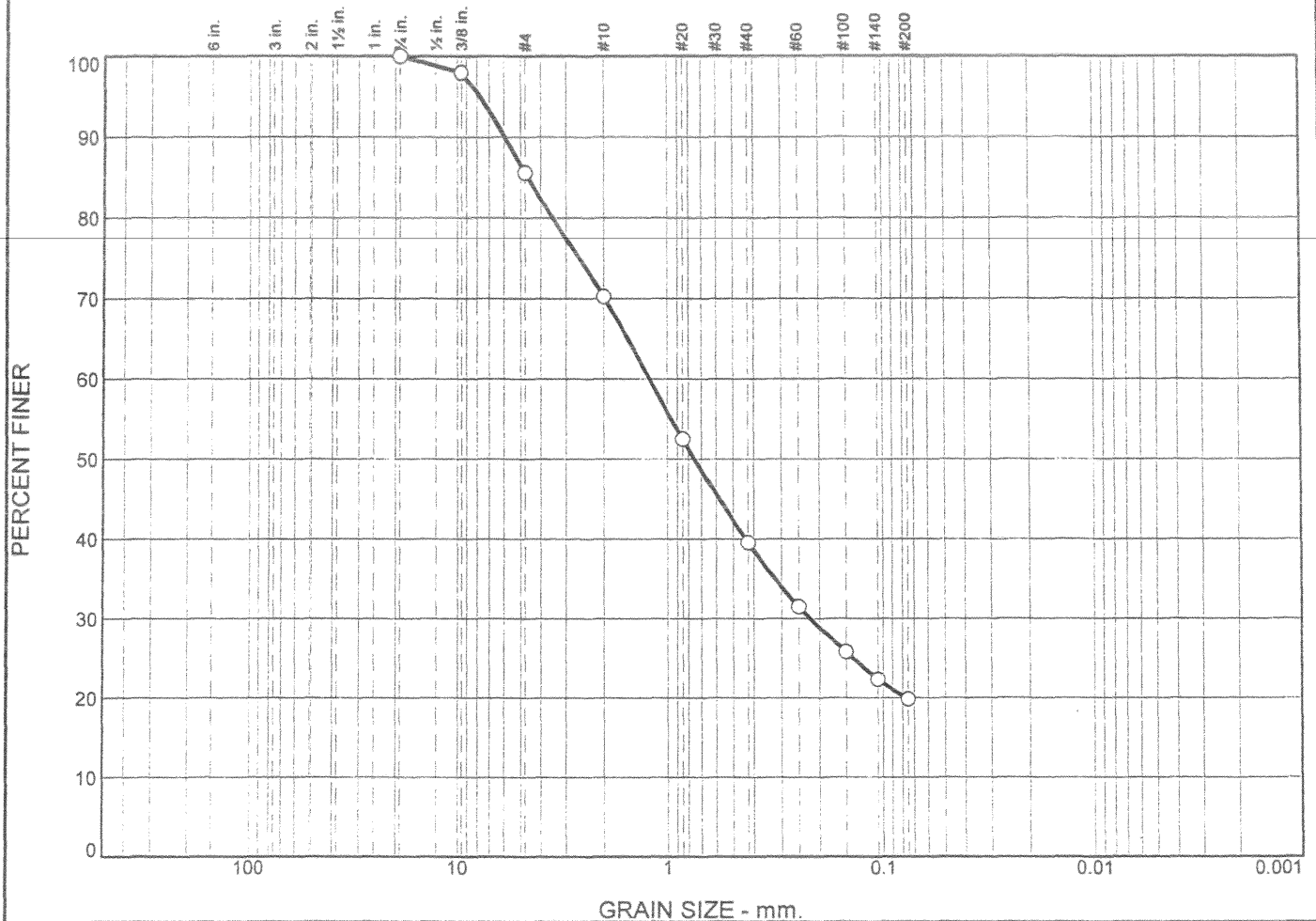
Sample Number: CB248

Remarks:

○ Moisture Content %10.1 CP05-
EAARS-CB-0346

Nodarse & Associates, Inc.

Particle Size Distribution Report



GRAIN SIZE - mm.										
% +3"			% Gravel		% Sand			% Fines		
			Coarse	Fine	Coarse	Medium	Fine	Silt		Clay
○	0.0		0.0	14.4	15.3	30.7	19.7	19.9		
×	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○			4.6041	1.2124	0.7504	0.2212				

Material Description							USCS	AASHTO
Silty sand with gravel							SM	

Project No. 05-05-0013- Client: Black & Veatch

Project: E.A.A (Reservoir)W/O#6

Source of Sample: CB260

Depth: 13.0'-13.5

Sample Number: CB260

Remarks:

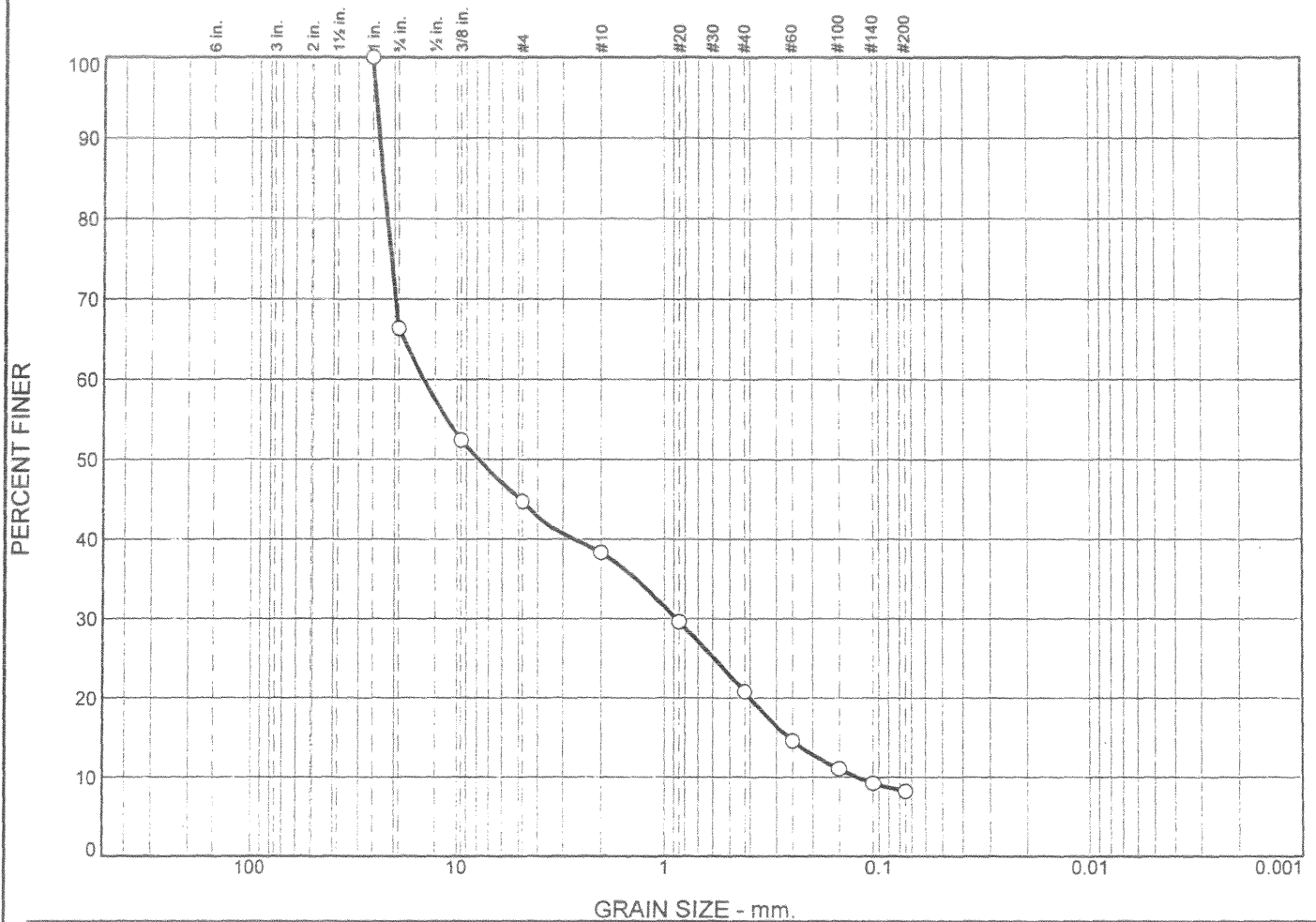
Moisture Content % 20.6 CP05-
EAARS-CB-0358

Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Particle Size Distribution Report



GRAIN SIZE - mm.										
% +3"			% Gravel		% Sand			% Fines		
			Coarse	Fine	Coarse	Medium	Fine	Silt		Clay
○	0.0		33.6	21.7	6.4	17.5	12.6	8.2		
×	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○			22.6245	14.3998	7.8074	0.8766	0.2614	0.1242	0.43	115.97

Material Description							USCS	AASHTO
○ Poorly graded gravel with silt and sand							GP-GM	

Project No. 05-05-0013- Client: Black & Veatch

Project: E.A.A (Reservoir)W/O#6

○ Source of Sample: CB262

Depth: 8.5'-10.0

Sample Number: CB262

Remarks:

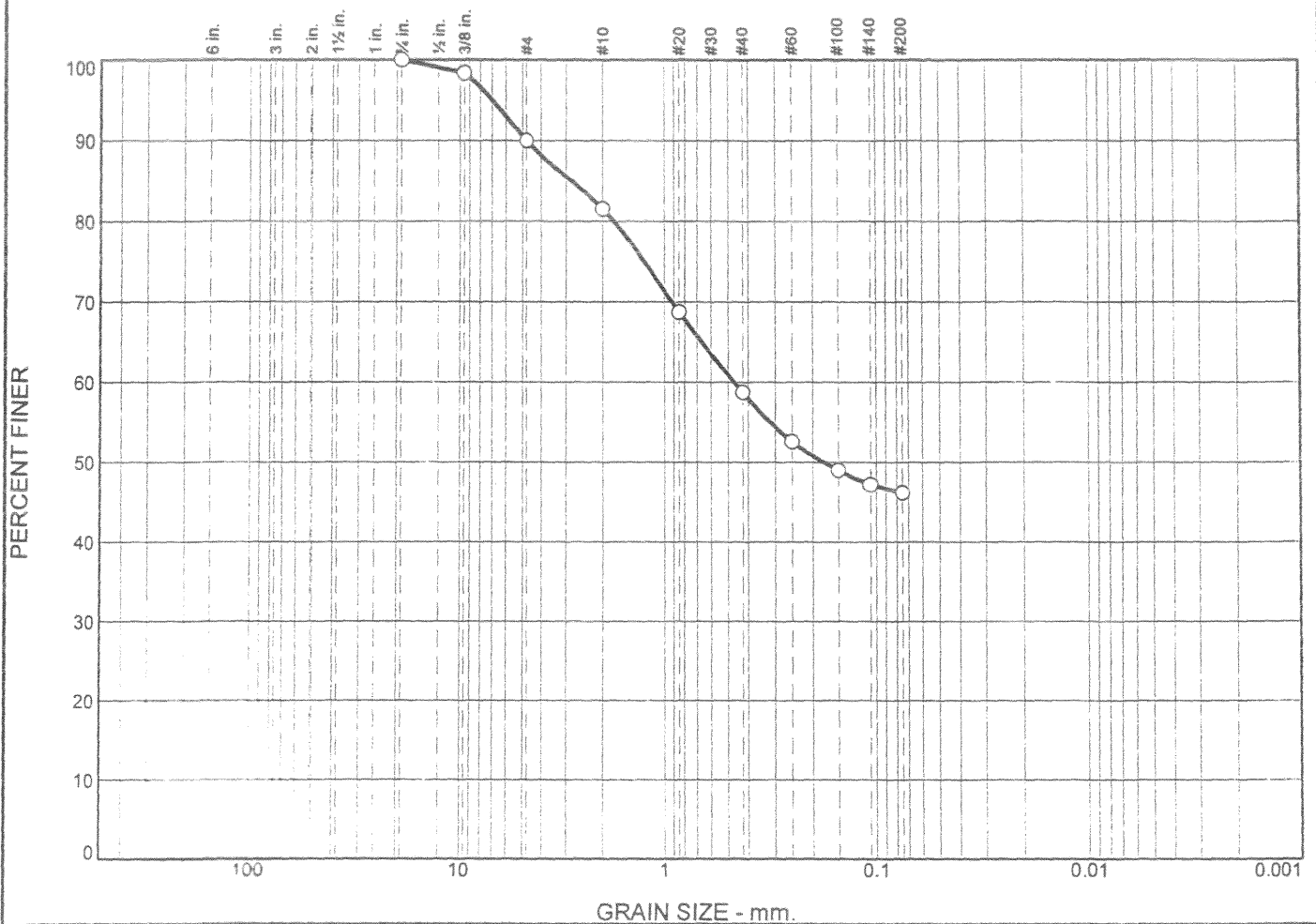
○ Moisture Content % 25.6 CP05-
EAARS-CB-0360

Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Particle Size Distribution Report



GRAIN SIZE - mm.									
% +3"	% Gravel		% Sand			% Fines			
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay		
○ 0.0	0.0	10.0	8.4	22.8	12.6	46.2			
×	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c
○			2.8203	0.4664	0.1766				

Material Description						USCS	AASHTO
○ Silty sand with gravel						SM	

Project No. 05-05-0013- Client: Black & Veatch

Project: E.A.A (Reservoir)W/O#6

○ Source of Sample: CB262

Depth: 13.5'-15.0'

Sample Number: CB262

Remarks:

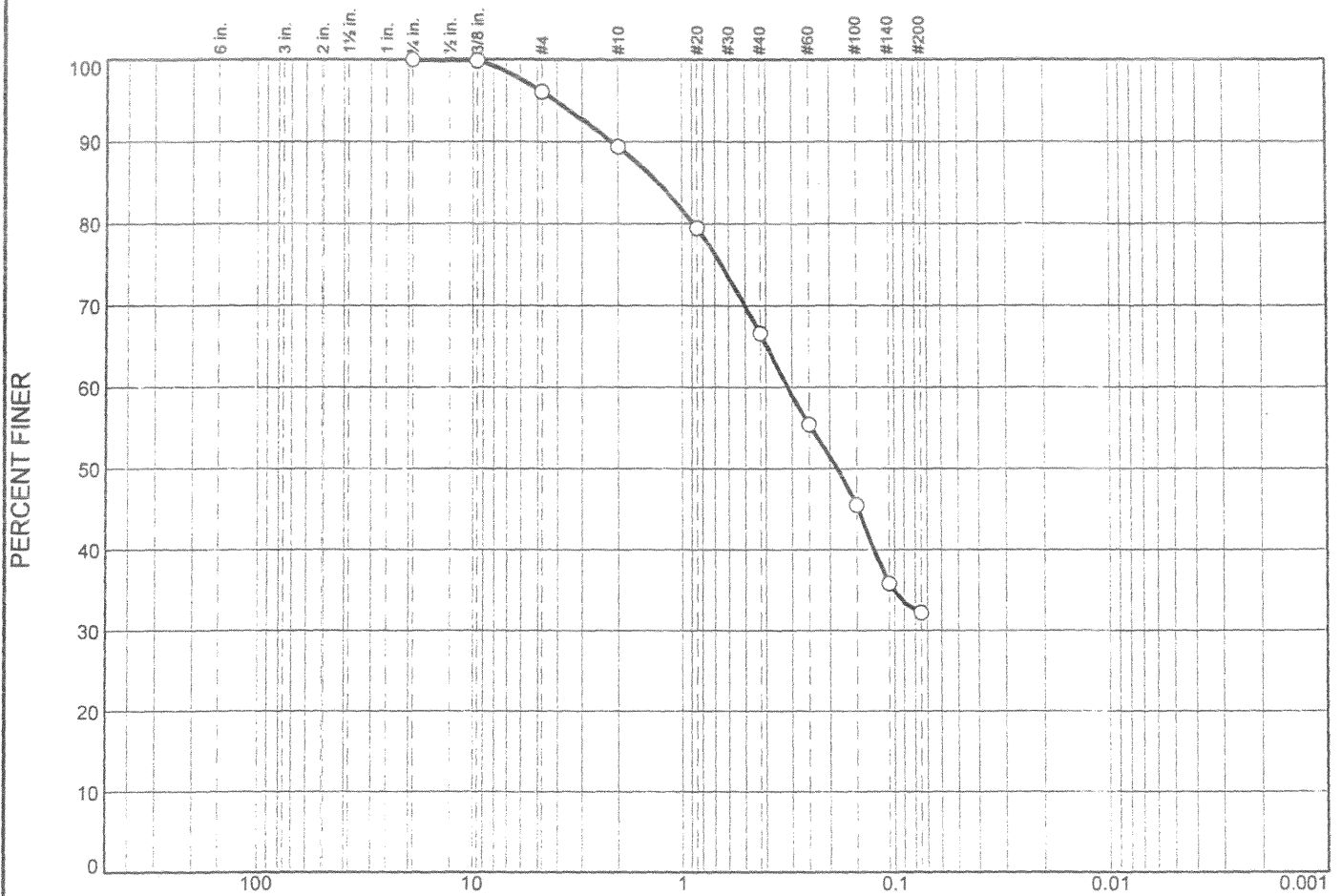
○ Moisture Content % 31.4 CP05-
EAARS-CB-0360

Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Particle Size Distribution Report



GRAIN SIZE - mm.

% +3"		% Gravel		% Sand			% Fines			
		Coarse	Fine	Coarse	Medium	Fine	Silt		Clay	
○	0.0	0.0	3.9	6.7	22.8	34.4	32.2			
×	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○			1.2941	0.3140	0.1833					
Material Description									USCS	AASHTO
○ Silty sand									SM	

Project No. 05-05-0013- Client: Black & Veatch

Project: E.A.A (Reservoir)W/O#6

○ Source of Sample: CB262

Depth: 18.5'-20.0

Sample Number: CB262

Remarks:

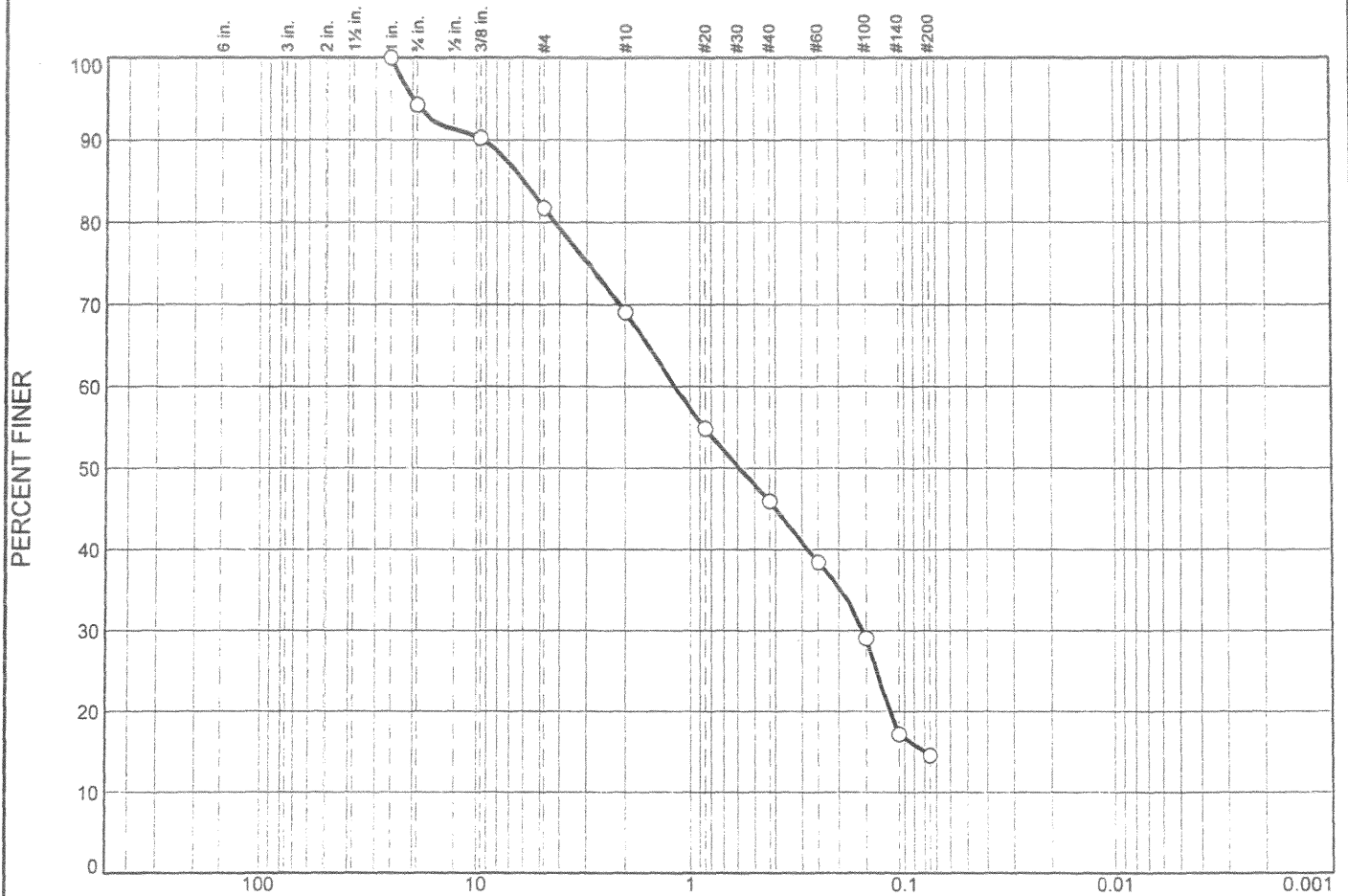
○ Moisture Content % 24.2 CP05-
EAARS-CB-0360

Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Particle Size Distribution Report



GRAIN SIZE - mm.

	% +3"		% Gravel		% Sand			% Fines		
			Coarse	Fine	Coarse	Medium	Fine	Silt		Clay
○	0.0		5.7	12.5	12.7	23.2	31.4	14.5		
×	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○			5.9210	1.1761	0.5855	0.1547	0.0796			

Material Description

Silty sand with gravel

USCS

SM

AASHTO

Project No. 05-05-0013- Client: Black & Veatch

Project: E.A.A (Reservoir)W/O#6

Source of Sample: CB262

Depth: 23.5'-25.0

Sample Number: CB262

Remarks:

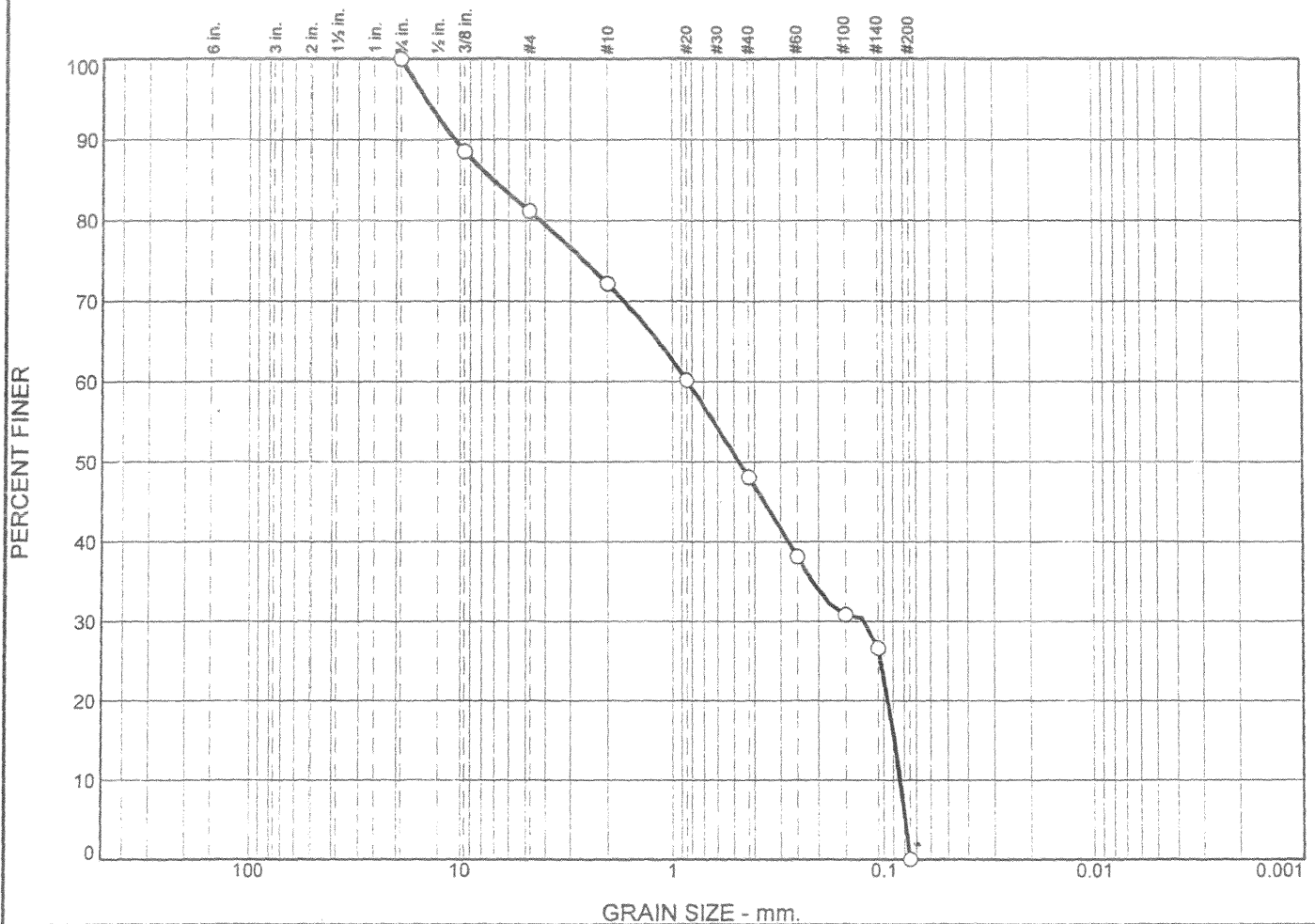
Moisture Content % 21.9 CP05-
EAARS-CB-0360

Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Particle Size Distribution Report



GRAIN SIZE - mm.

	% +3"		% Gravel		% Sand			% Fines		
			Coarse	Fine	Coarse	Medium	Fine	Silt		Clay
○	0.0		0.0	18.8	9.0	24.1	48.1	0.0		0.0
×	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○			7.0631	0.8402	0.4709	0.1204	0.0886	0.0836	0.21	10.06

Material Description						USCS	AASHTO
○ Poorly graded sand with gravel						SP	

Project No. 05-05-0013- Client: Black & Veatch

Project: E.A.A (Reservoir)W/O#6

○ Source of Sample: CB268

Depth: 0.0'-1.5'

Sample Number: CB268

Remarks:

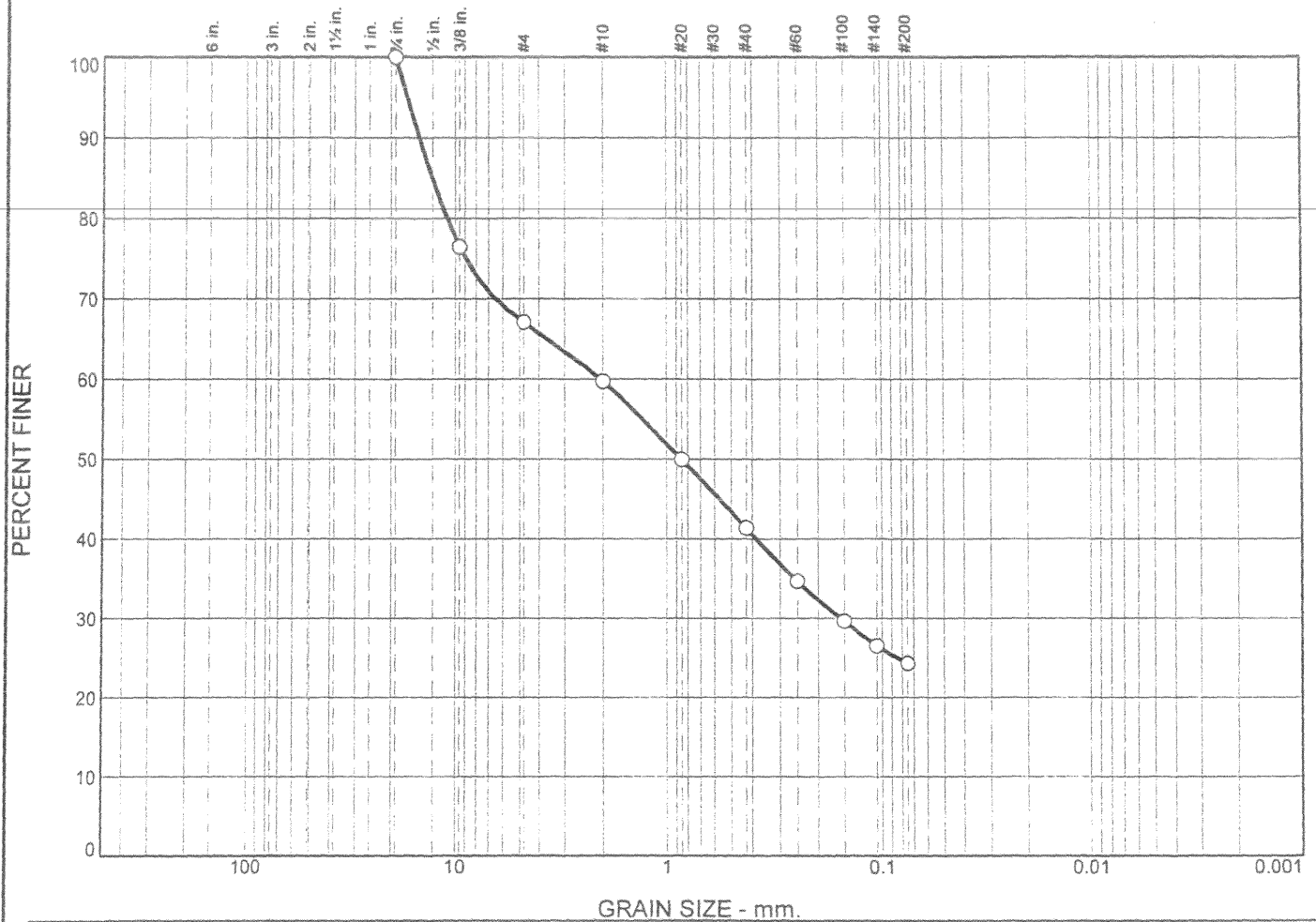
○ Moisture Content % 10.1 CP05-
EAARS-CB-0365

Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Particle Size Distribution Report



GRAIN SIZE - mm.										
% +3"			% Gravel		% Sand			% Fines		
			Coarse	Fine	Coarse	Medium	Fine	Silt		Clay
○	0.0		0.0	32.9	7.3	18.4	17.1	24.3		
×	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○			12.7439	2.0512	0.8540	0.1557				

Material Description							USCS	AASHTO
○ Silty sand with gravel							SM	

Project No. 05-05-0013- Client: Black & Veatch
 Project: E.A.A (Reservoir)W/O#6

○ Source of Sample: CB268 Depth: 1.5'-3.0' Sample Number: CB268

Nodarse & Associates, Inc.

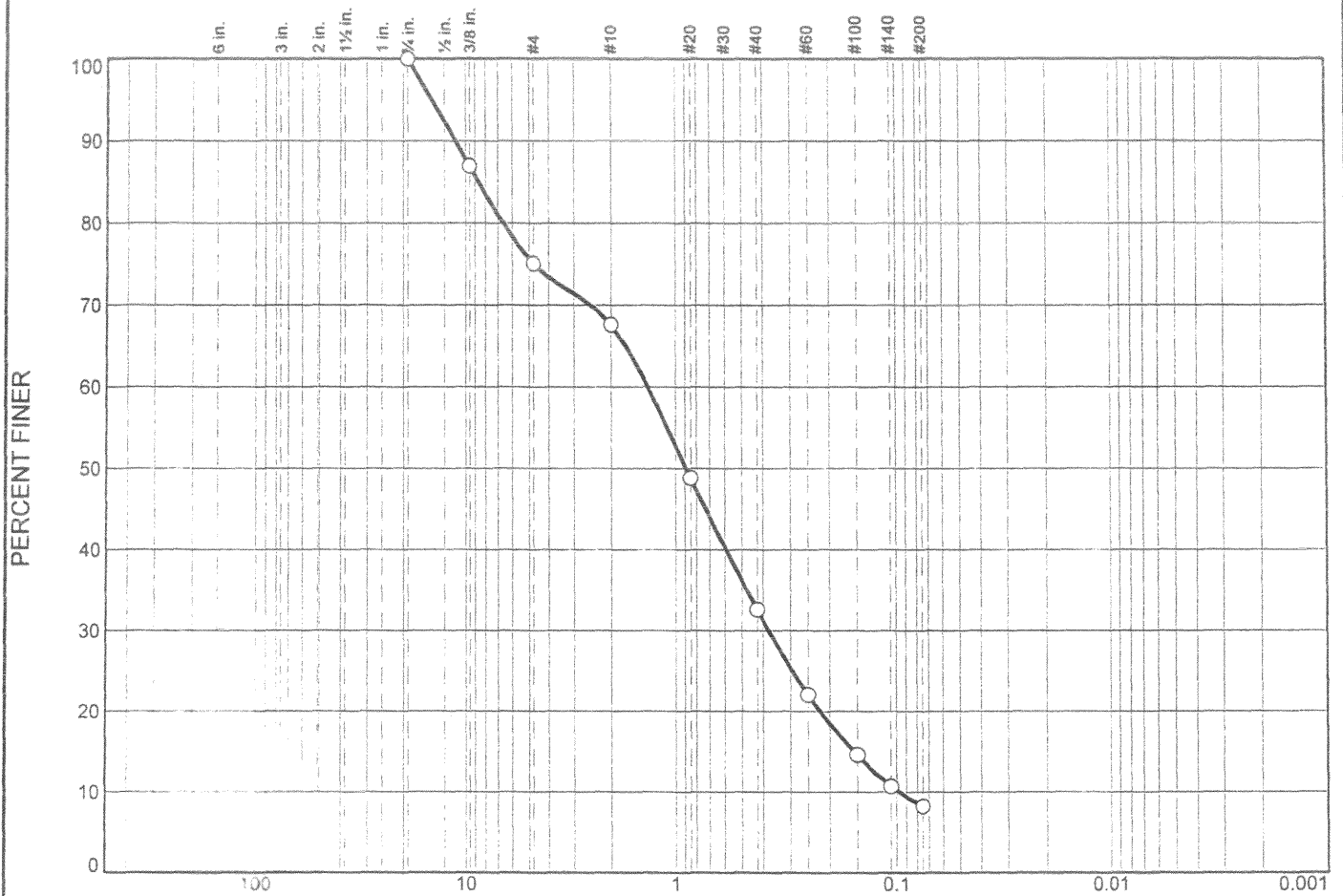
Miami Lakes, FL

Remarks:

○ Moisture Content % 12.9 CP05-
 EAARS-CB-0365

Figure

Particle Size Distribution Report



GRAIN SIZE - mm.

	% +3"	% Gravel		% Sand			% Fines		
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	
○	0.0	0.0	24.9	7.5	35.0	24.4	8.2		
×	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c
○			8.6202	1.3374	0.8908	0.3760	0.1545	0.0975	1.08
									C _u
									13.71

Material Description	USCS	AASHTO
○ Poorly graded sand with silt and gravel	SP-SM	

Project No. 05-05-0013- Client: Black & Veatch

Project: E.A.A (Reservoir)W/O#6

○ Source of Sample: CB268

Depth: 3.5'-5.0

Sample Number: CB268

Remarks:

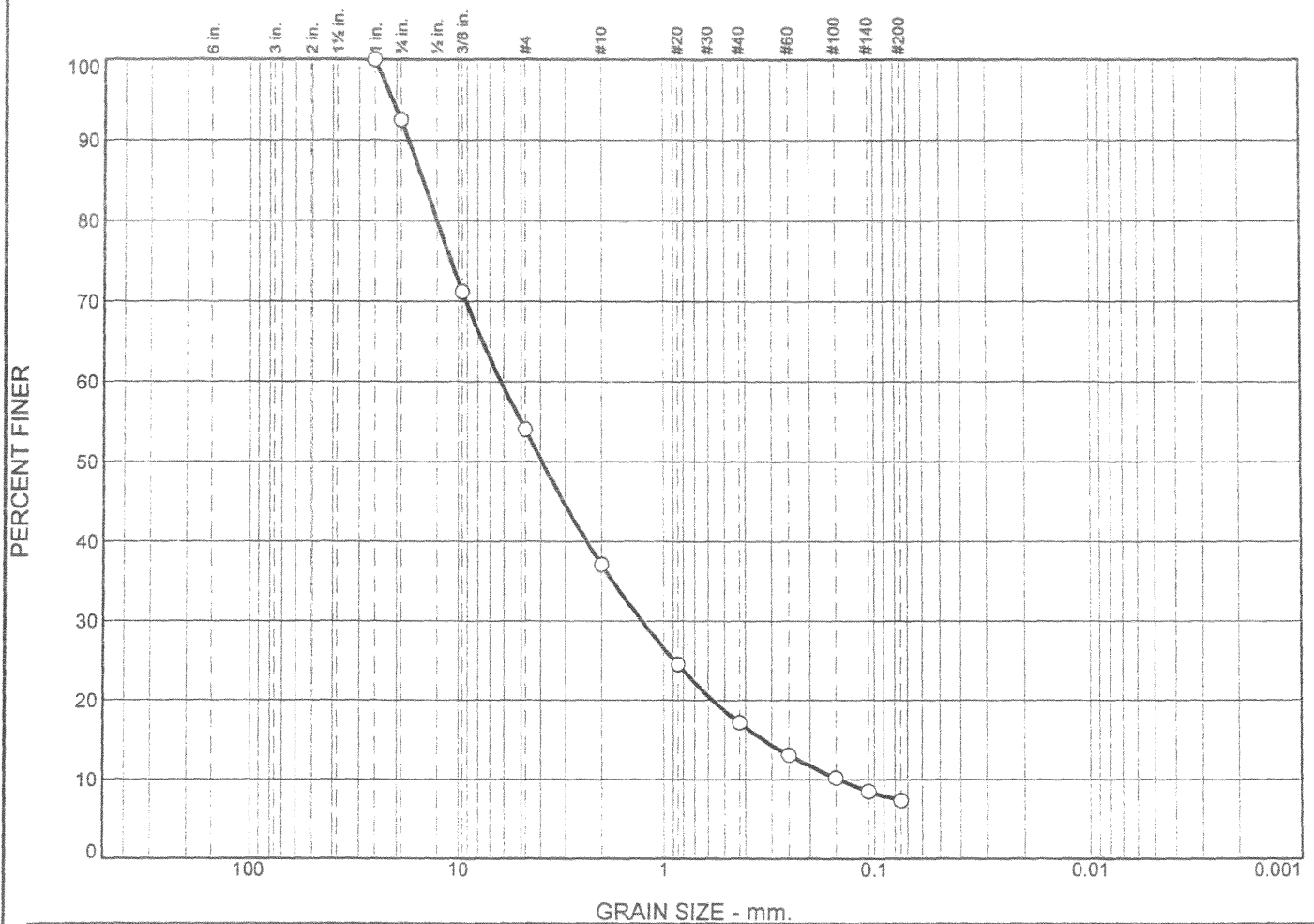
○ Moisture Content % 87.5 CP05-
EAARS-CB-0365

Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Particle Size Distribution Report



GRAIN SIZE - mm.										
% +3"			% Gravel		% Sand			% Fines		
			Coarse	Fine	Coarse	Medium	Fine	Silt		Clay
○	0.0		7.4	38.5	17.0	19.9	9.8	7.4		
×	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○			14.8118	6.1887	3.9230	1.2769	0.3276	0.1446	1.82	42.80
Material Description								USCS	AASHTO	
○ Poorly graded sand with silt and gravel								SP-SM		

Project No. 05-05-0013- Client: Black & Veatch

Project: E.A.A (Reservoir)W/O#6

○ Source of Sample: CB268

Depth: 5.0'-6.5'

Sample Number: CB268

Remarks:

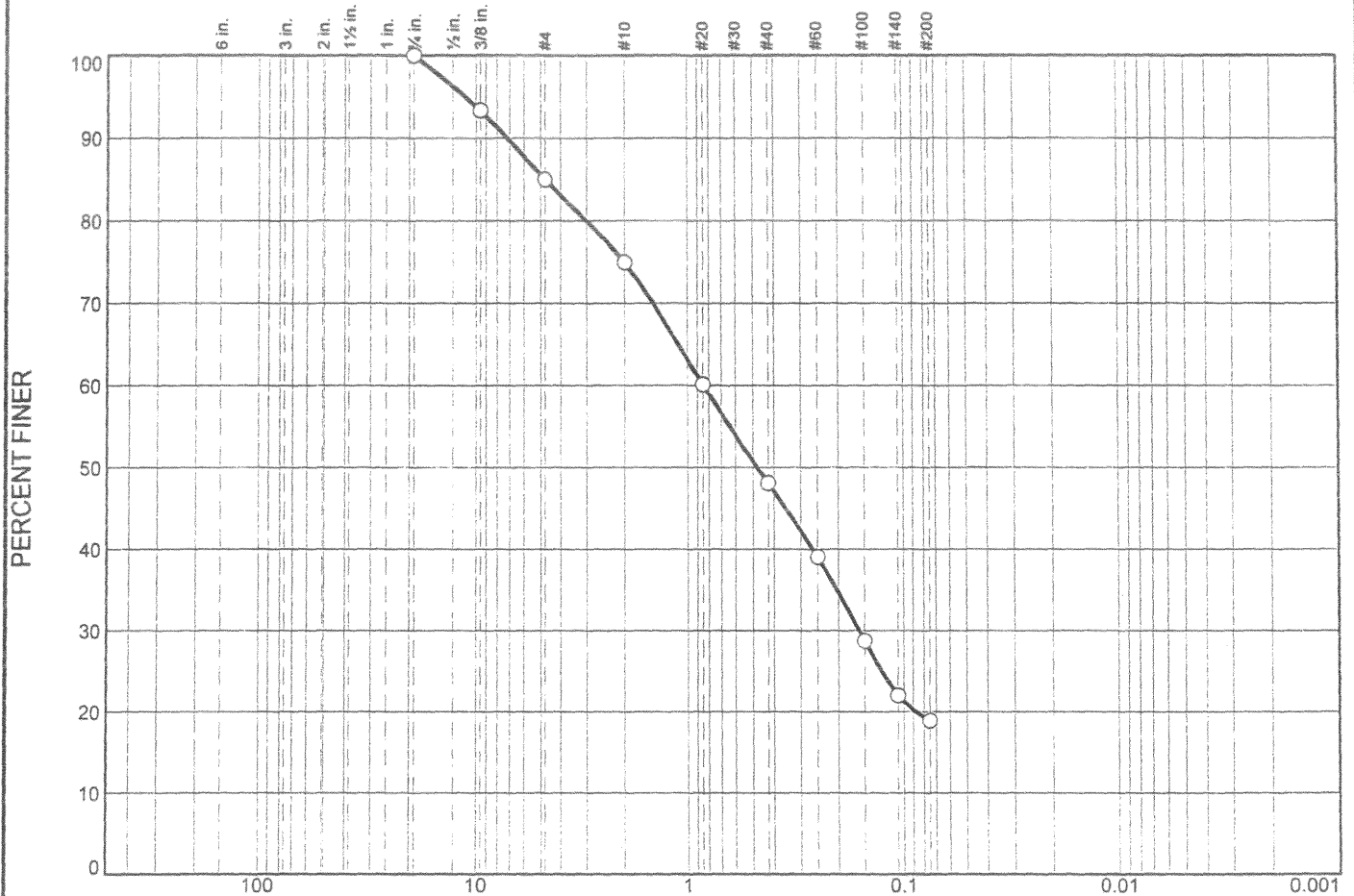
○ Moisture Content % 12.8 CP05-
EAARS-CB-0365

Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Particle Size Distribution Report



GRAIN SIZE - mm.

	% +3"	% Gravel		% Sand			% Fines		
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	
<input type="radio"/>	0.0	0.0	15.0	10.0	26.9	29.2	18.9		
<input checked="" type="checkbox"/>	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c
<input type="radio"/>			4.7460	0.8429	0.4759	0.1589			
Material Description							USCS	AASHTO	
<input type="radio"/> Silty sand with gravel							SM		

Project No. 05-05-0013- Client: Black & Veatch

Project: E.A.A (Reservoir)W/O#6

☐ Source of Sample: CB268

Depth: 11.5'-13.0

Sample Number: CB268

Remarks:

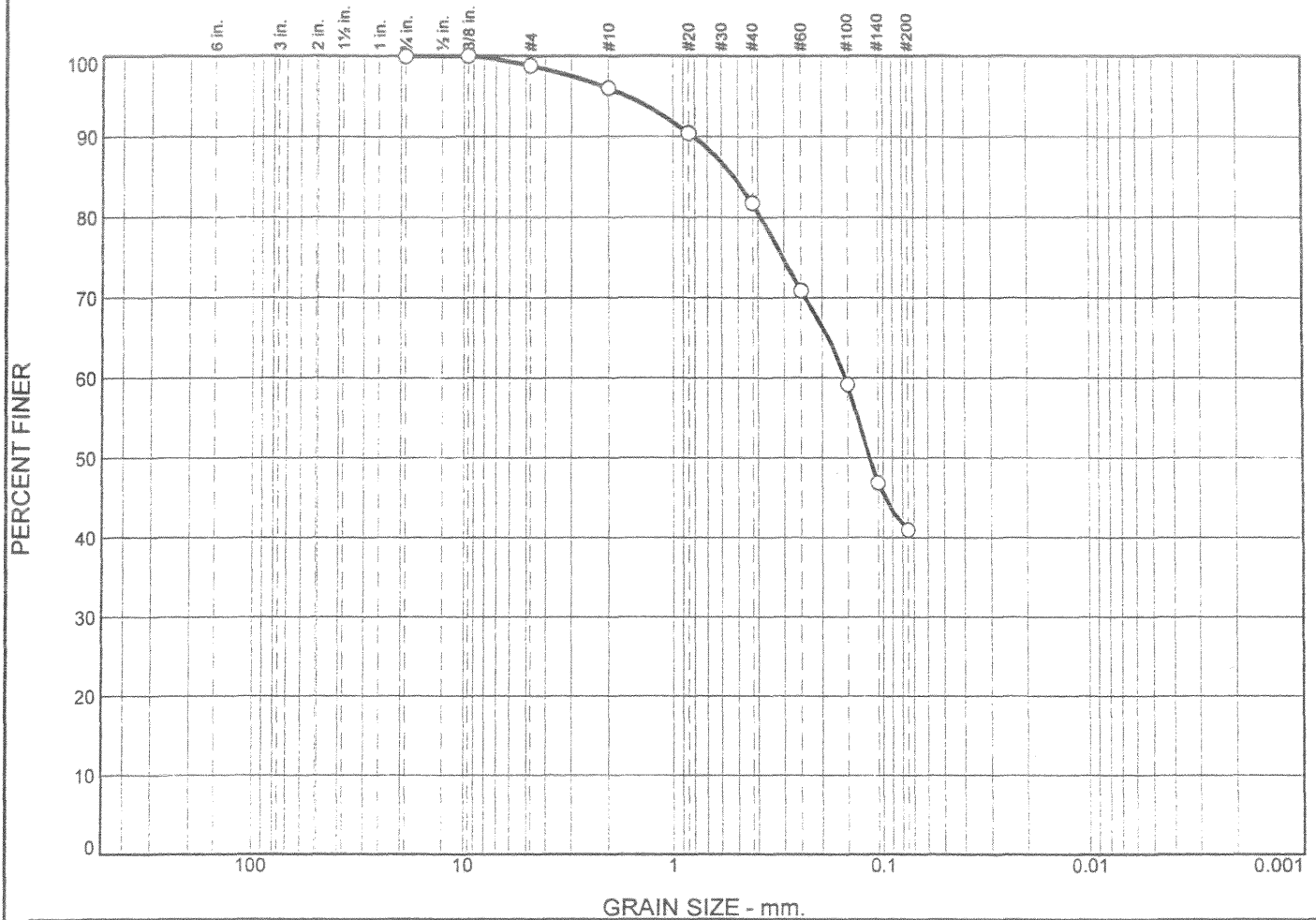
☐ Moisture Content % 29.3 CP05-
EAARS-CB-0365

Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Particle Size Distribution Report



GRAIN SIZE - mm.										
% +3"			% Gravel		% Sand			% Fines		
			Coarse	Fine	Coarse	Medium	Fine	Silt		Clay
○	0.0		0.0	1.2	2.8	14.2	40.8	41.0		
×	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○			0.5194	0.1536	0.1167					

Material Description							USCS	AASHTO
Silty sand							SM	

Project No. 05-05-0013- Client: Black & Veatch

Project: E.A.A (Reservoir)W/O#6

Source of Sample: CB268

Depth: 18.5'-22.0'

Sample Number: CB268

Remarks:

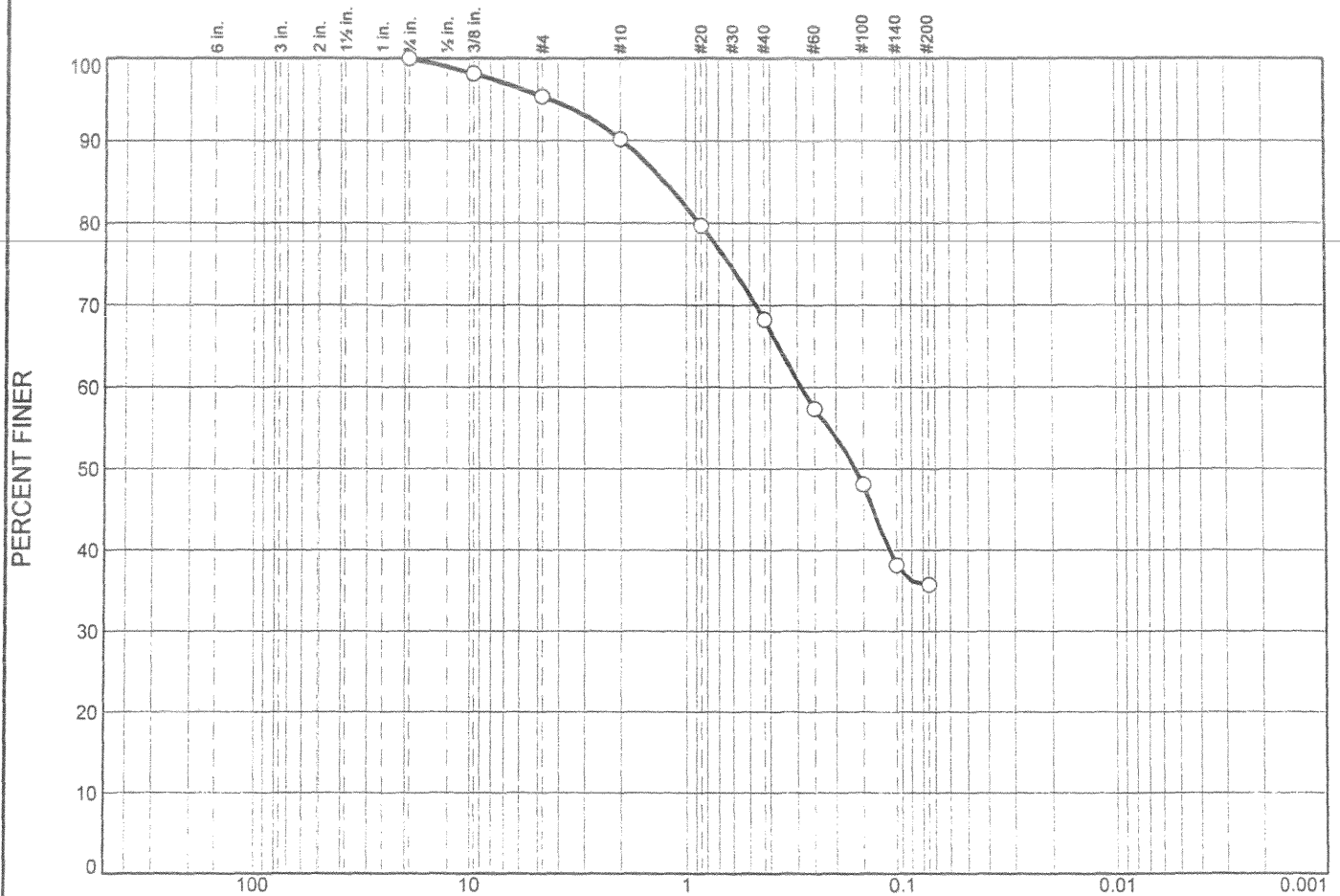
Moisture Content % 23.0 CP05-
EAARS-CB-0365

Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Particle Size Distribution Report



GRAIN SIZE - mm.

GRAVEL SIZE mm.											
% +3"		% Gravel		% Sand			% Fines				
		Coarse	Fine	Coarse	Medium	Fine	Silt		Clay		
○	0.0		0.0	4.6	5.2	21.9	32.6	35.7			
×	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u	
○			1.2520	0.2875	0.1620						
Material Description									USCS	AASHTO	
○ Silty sand									SM		

Project No. 05-05-0013- Client: Black & Veatch

Project: E.A.A (Reservoir)W/O#6

Source of Sample: CB268

Depth: 23.5'-25.0

Sample Number: CB268

Remarks:

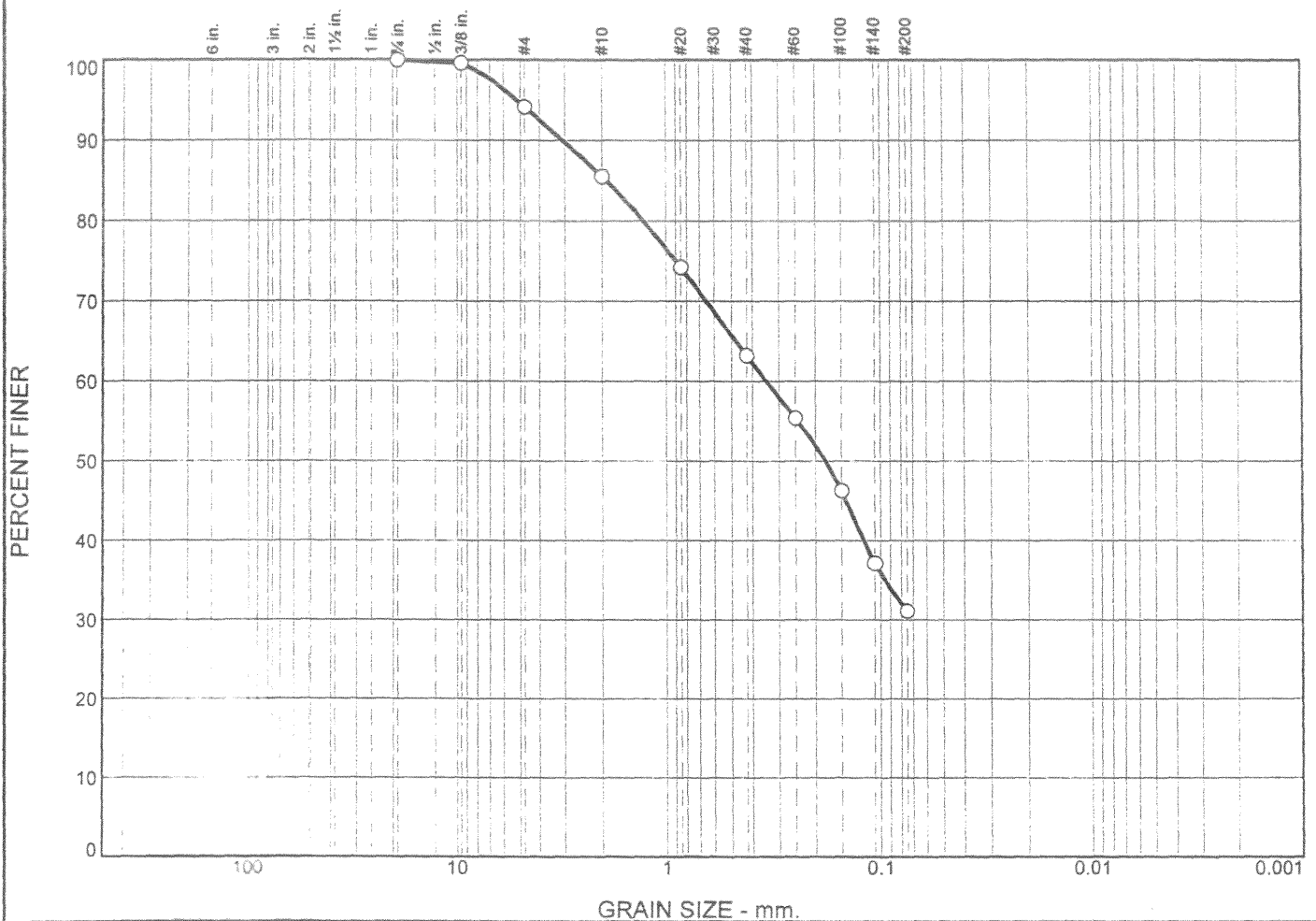
Moisture Content % 22.5 CP05-
EAARS-CB-0365

Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Particle Size Distribution Report



GRAIN SIZE - mm.									
% +3"		% Gravel		% Sand			% Fines		
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	
○	0.0	0.0	5.8	8.7	22.3	32.1	31.1		
×	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c
○			1.9072	0.3429	0.1781				

Material Description							USCS	AASHTO
○ Silty sand							SM	

Project No. 05-05-0013- Client: Black & Veatch Project: E.A.A (Reservoir)W/O#6 ○ Source of Sample: CB268 Depth: 28.5'-30.0 Sample Number: CB268	Remarks: ○ Moisture Content % 20.5 CP05- EAARS-CB-0365
Nodarse & Associates, Inc. Miami Lakes, FL	

Figure

The graph illustrates the grain size distribution of a soil sample. The y-axis represents the percentage of soil finer than a given grain size, ranging from 0 to 100. The x-axis represents the grain size in inches, with a logarithmic scale from 6 inches down to 0.001 mm. The curve shows that approximately 100% of the soil is finer than 6 inches, and about 11% of the soil is finer than 0.001 mm.

Grain Size (inches)	Grain Size (mm)	Percent Finer (%)
6 in.	152.4	100
3 in.	76.2	100
2 in.	50.8	100
1 1/2 in.	38.1	100
1 in.	25.4	100
3/4 in.	19.0	97
1/2 in.	12.5	88
3/8 in.	9.5	88
#4	4.75	75
#10	2.0	53
#20	0.85	37
#30	0.6	32
#40	0.425	31
#60	0.25	27
#100	0.15	20
#140	0.106	14
#200	0.075	11

[illegible]

Material Description	USCS	AASHTO
○ Poorly graded sand with silt and gravel	SP-sm	

Project: E.A.A (Reservoir)W/O#6

Sample Number: CB268

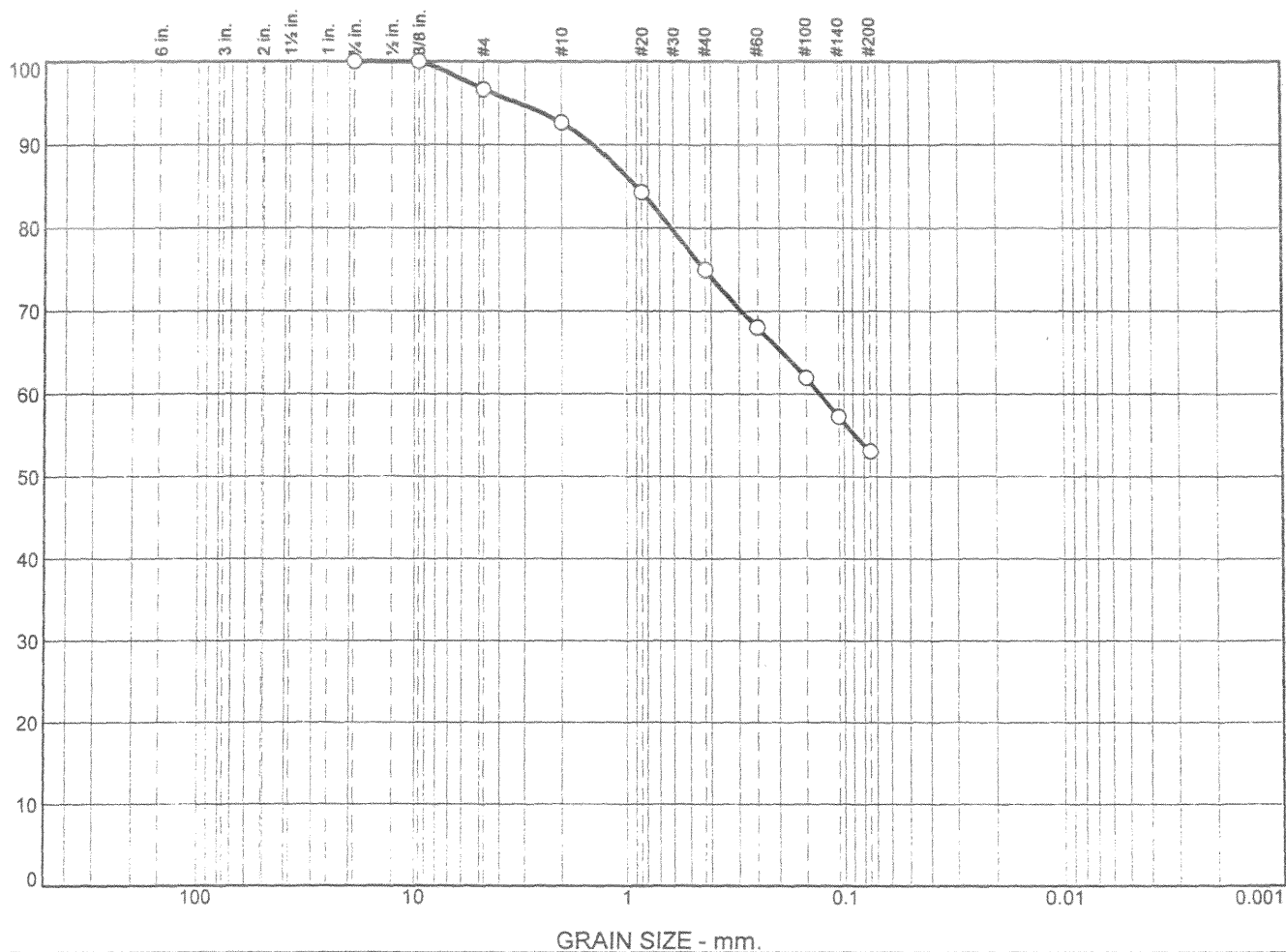
Miami Lakes, FL

Remarks:

Moisture Content % 12.9 CP05-
EAARS-CB-0365

Figure

PERCENT FINER

[illegible]

Material Description	USCS	AASHTO
○ Sandy silt	ML	

Project: E.A.A (Reservoir)W/O#6

Sample Number: CB276

Nodarse & Associates, Inc.

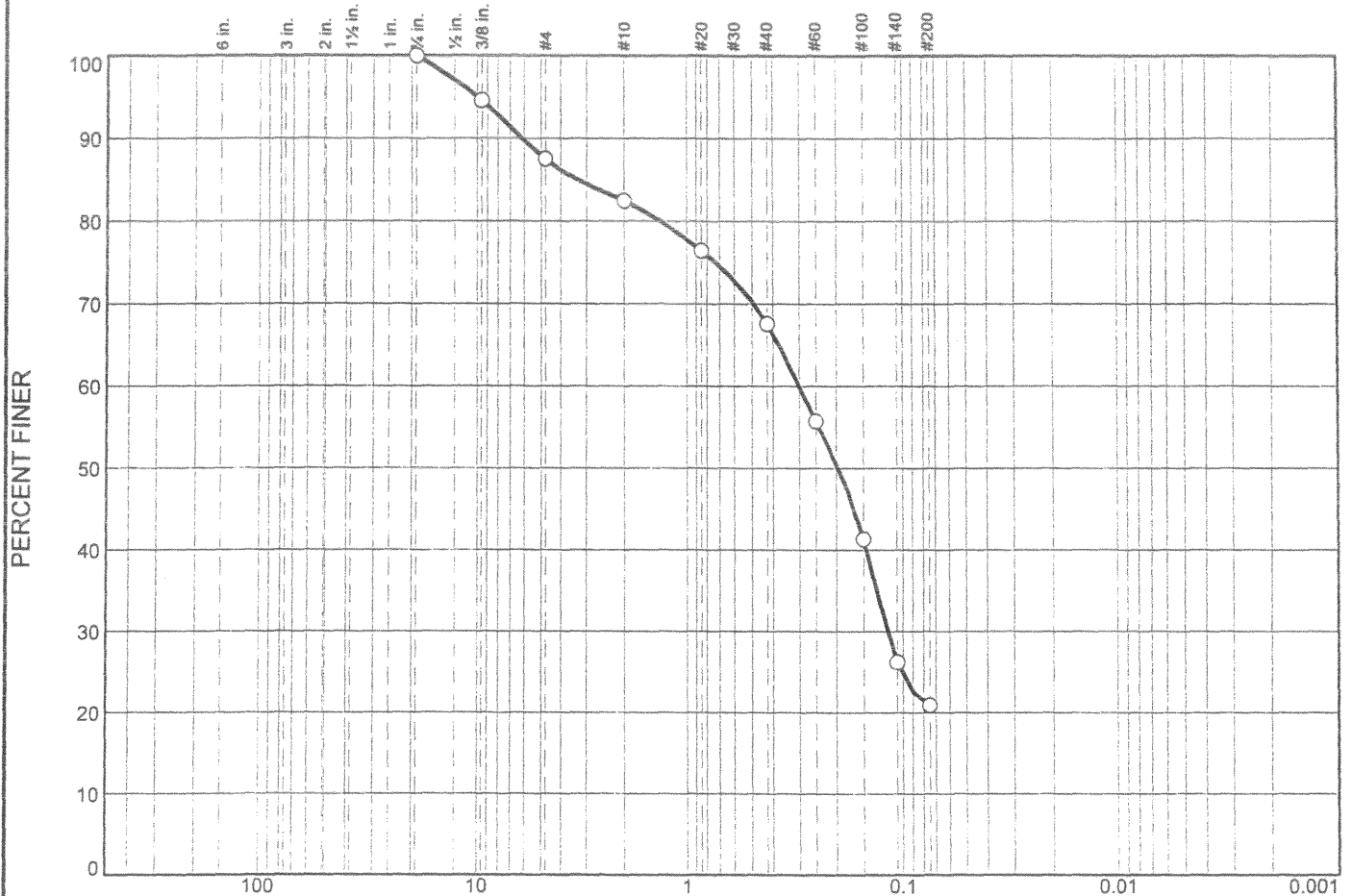
Miami Lakes, FL

Remarks:

Moisture Content % 19.0 CP05-
EAARS-CB-0372

Figure

Particle Size Distribution Report



GRAIN SIZE - mm.

GRAIN SIZE - mm.										
% +3"			% Gravel		% Sand			% Fines		
			Coarse	Fine	Coarse	Medium	Fine	Silt		Clay
○	0.0		0.0	12.5	5.0	14.9	46.7	20.9		
×	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○			3.2918	0.3002	0.1954	0.1170				
Material Description								USCS	AASHTO	
○ Silty sand with gravel								SM		

Project No. 05-05-0013- Client: Black & Veatch

Project: E.A.A (Reservoir)W/O#6

○ Source of Sample: CB277

Depth: 19.0'-20.5'

Sample Number: CB277

Remarks:

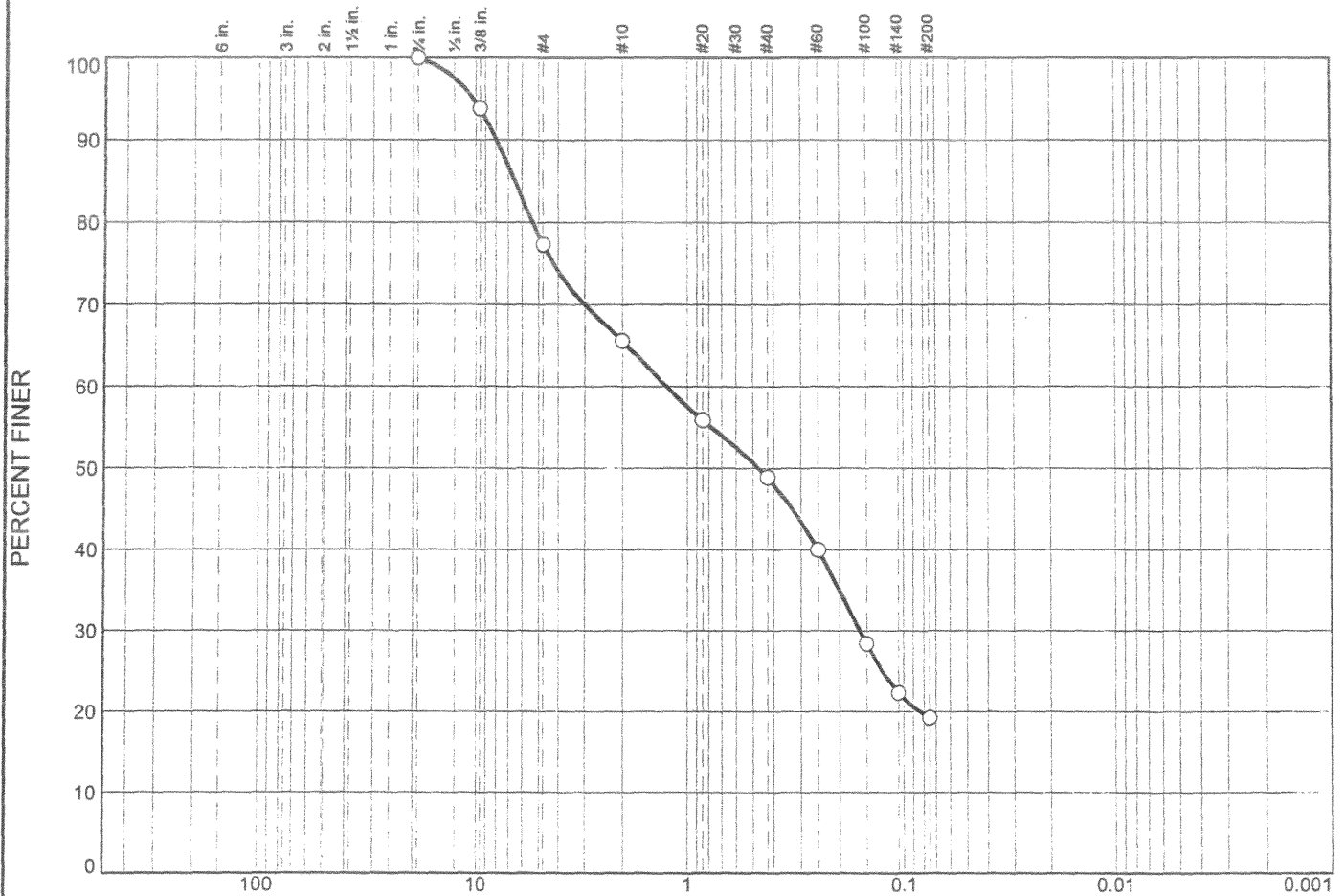
○ Moisture Content % 24.7 CP05-
EAARS-CB-0373

Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Particle Size Distribution Report



GRAIN SIZE - mm.

% +3"		% Gravel		% Sand			% Fines			
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay		
○	0.0	0.0	22.7	11.7	16.7	29.7	19.2			
×	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○			6.5031	1.2320	0.4654	0.1611				

Material Description

USCS

AASHTO

Silty sand with gravel

SM

Project No. 05-05-0013- Client: Black & Veatch

Project: E.A.A (Reservoir)W/O#6

Remarks:

Moisture Content % 21.6 CP05-
EAARS-CB-0373

Source of Sample: CB277

Depth: 29.0'-30.5'

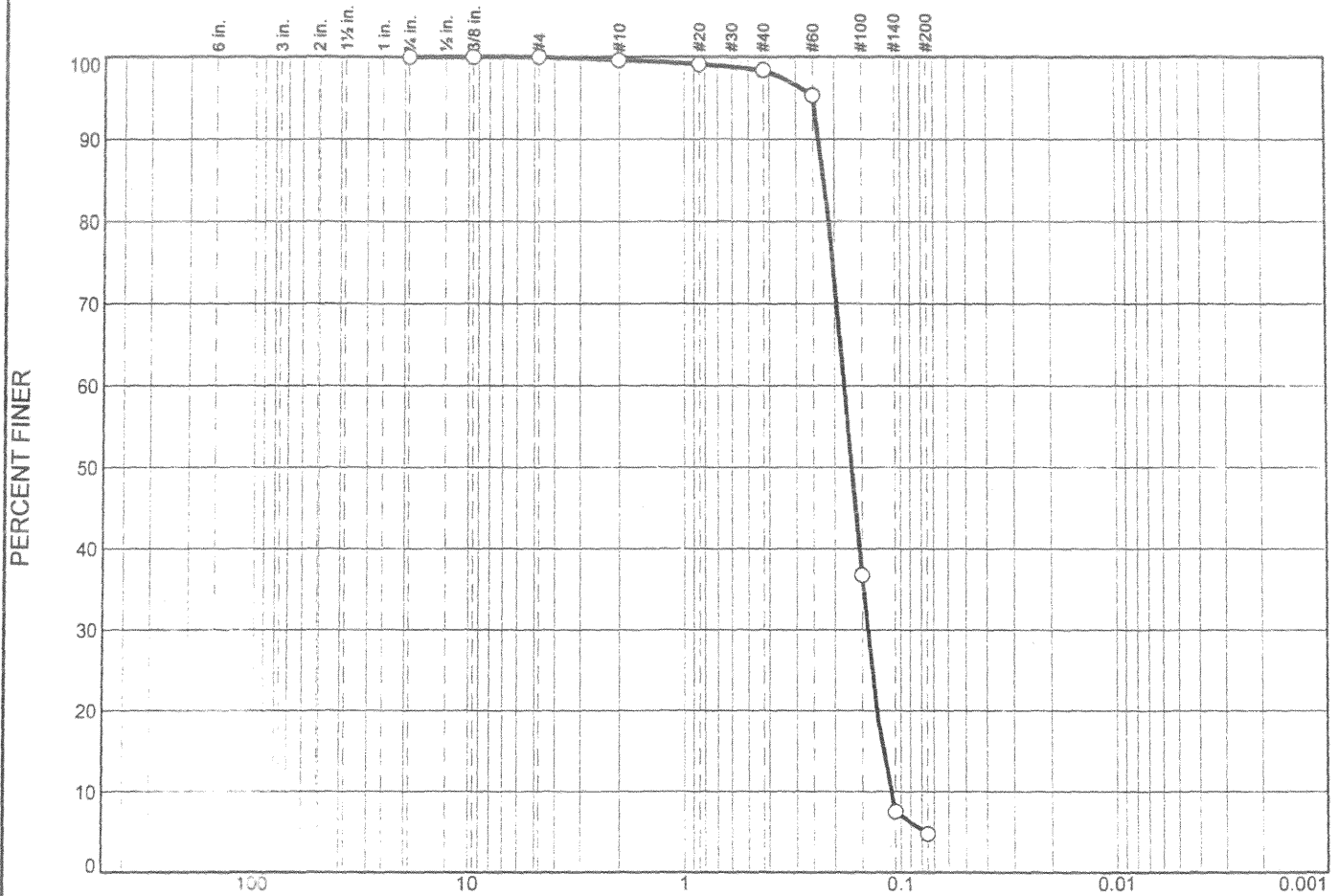
Sample Number: CB277

Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Particle Size Distribution Report



GRAIN SIZE - mm.

	% +3"		% Gravel		% Sand			% Fines	
			Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0		0.0	0.0	0.4	1.2	93.6	4.8	
×	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c
○			0.2214	0.1799	0.1667	0.1414	0.1204	0.1116	1.00
									C _u
									1.61
Material Description								USCS	AASHTO
○ Poorly graded sand								sp	

Project No. 05-05-0013- Client: Black & Veatch

Project: E.A.A (Reservoir)W/O#6

○ Source of Sample: CB277

Depth: 34.0'-35.5'

Sample Number: CB277

Remarks:

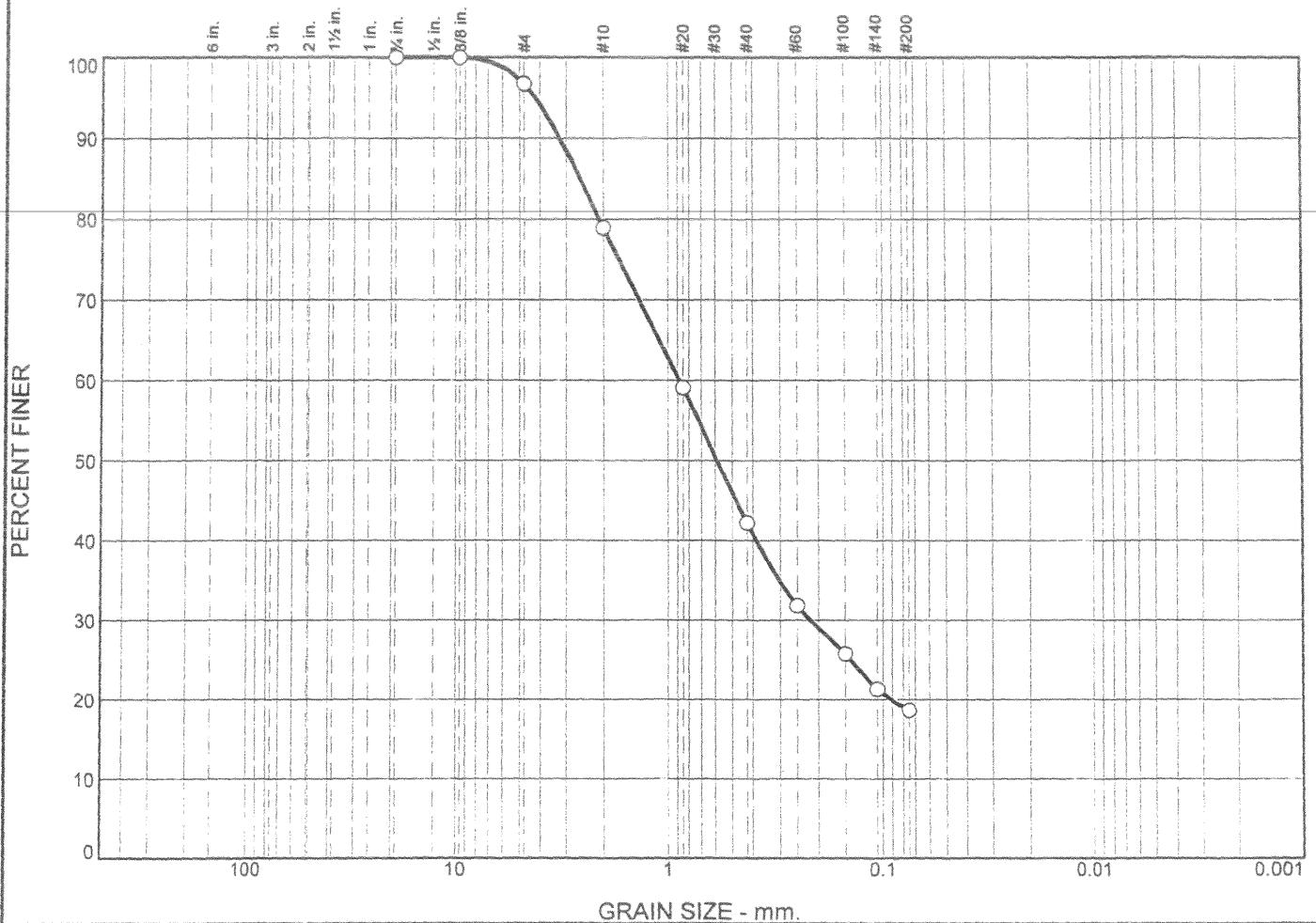
○ Moisture Content % 25.5 CP05-
EAARS-CB-0373

Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Particle Size Distribution Report



GRAIN SIZE - mm.										
% +3"			% Gravel		% Sand			% Fines		
			Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	
○	0.0		0.0	3.2	17.8	36.8	23.6	18.6		
×	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○			2.5756	0.8822	0.5869	0.2173				
Material Description								USCS	AASHTO	
○ Silty sand with gravel								SM		

Project No. 05-05-0013- Client: Black & Veatch

Project: E.A.A (Reservoir)W/O#6

○ Source of Sample: CB281

Depth: 15.5'-17.0'

Sample Number: CB281

Remarks:

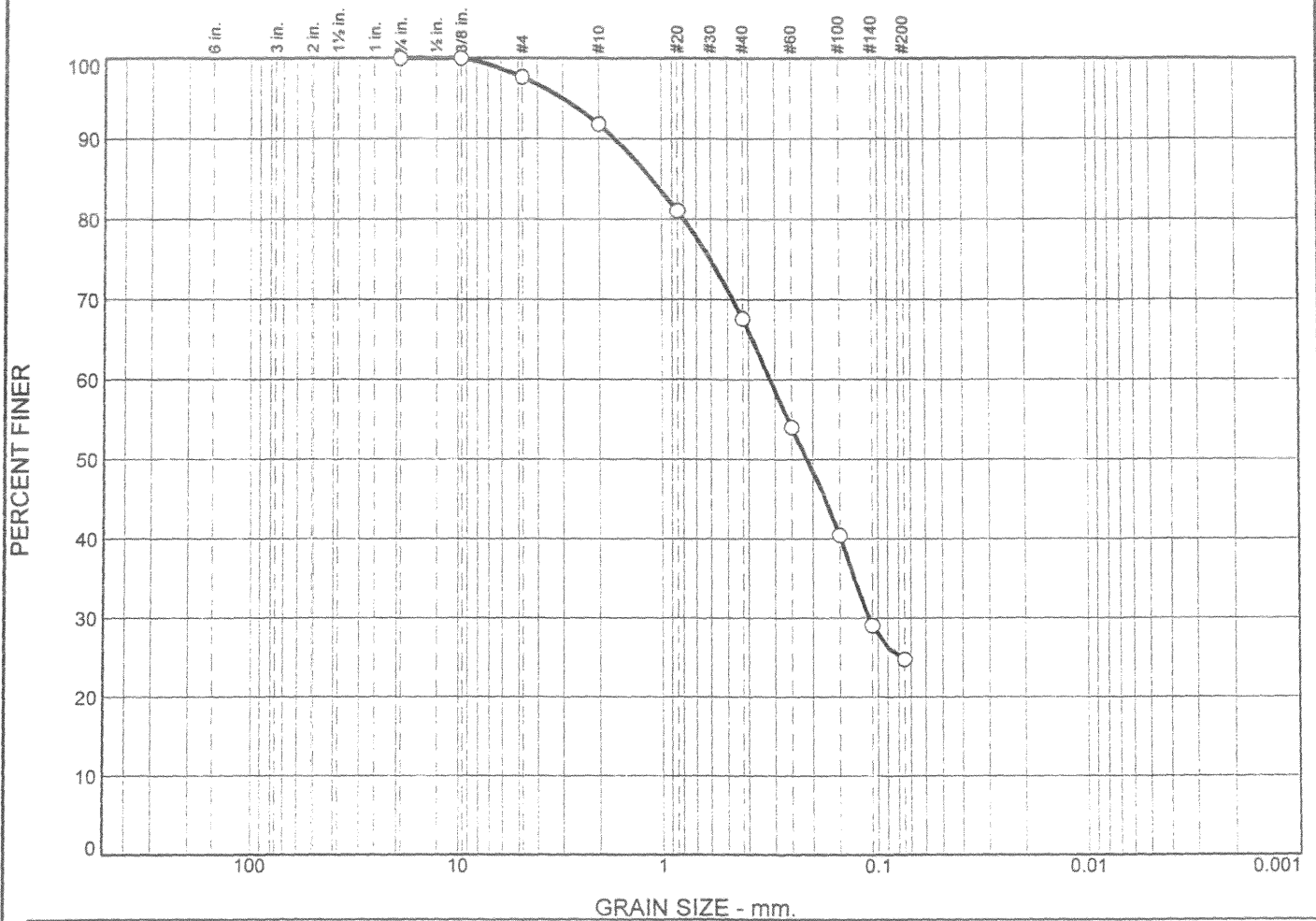
○ Moisture Content %18.2 CB05-FAARS-CB-0377

Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Particle Size Distribution Report



GRAIN SIZE - mm.										
% +3"			% Gravel		% Sand			% Fines		
			Coarse	Fine	Coarse	Medium	Fine	Silt		Clay
○	0.0		0.0	2.3	5.9	24.2	42.8	24.8		
×	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○			1.1108	0.3153	0.2118	0.1100				
Material Description								USCS	AASHTO	
○ Silty sand								SM		

Project No. 05-05-0013- Client: Black & Veatch
 Project: E.A.A (Reservoir)W/O#6

○ Source of Sample: CB281 Depth: 19'-20.5' Sample Number: CB281

Nodarse & Associates, Inc.

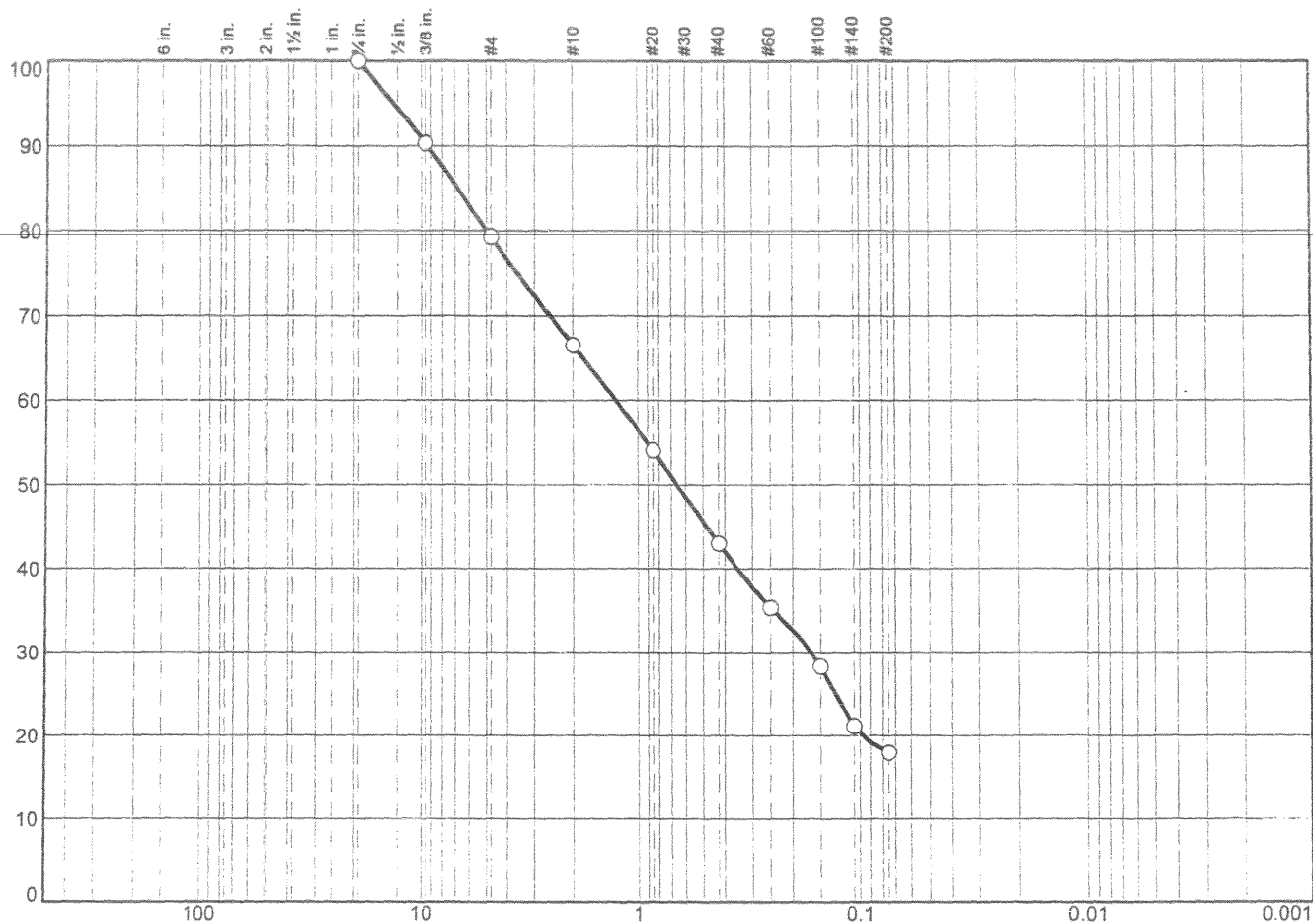
Miami Lakes, FL

Remarks:

○ Moisture Content % 26.1 CB05-
 EAARS-CB-0377

Figure

PERCENT FINER



GRAIN SIZE - mm.										
% +3"		% Gravel		% Sand			% Fines			
		Coarse	Fine	Coarse	Medium	Fine	Silt		Clay	
○	0.0	0.0	20.7	12.8	23.5	25.0	18.0			
×	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○			6.7792	1.2674	0.6570	0.1652				
Material Description									USCS	AASHTO
○ Silty sand with gravel									SM	

Project: E.A.A (Reservoir)W/O#6

Sample Number: CB281

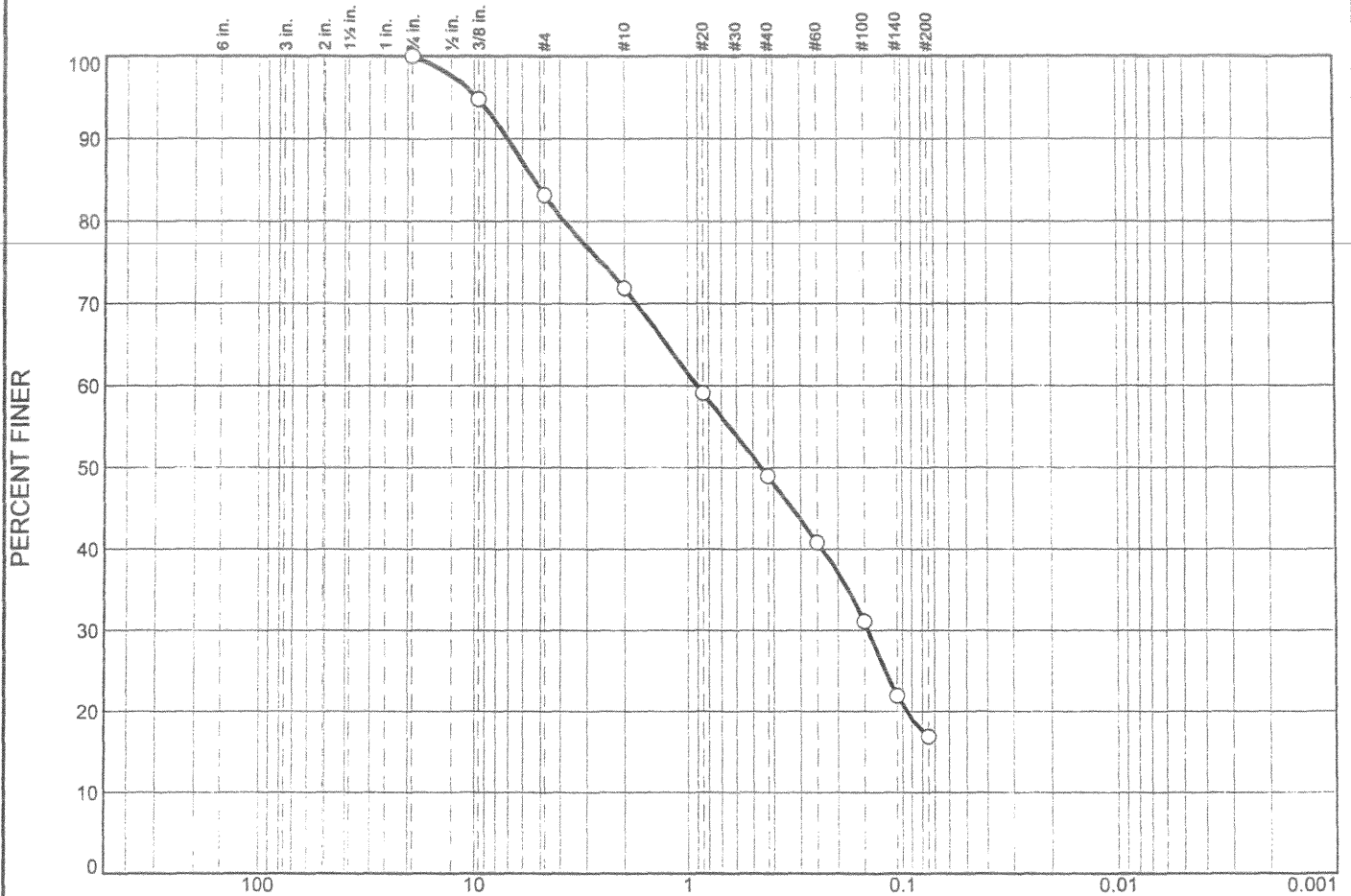
Nodarse & Associates, Inc.

Miami Lakes, FL

○Moisture Content % 19.3 CB05-
EAARS-CB-0377

Figure

Particle Size Distribution Report



GRAIN SIZE - mm.

	% +3"		% Gravel		% Sand			% Fines		
			Coarse	Fine	Coarse	Medium	Fine	Silt		Clay
○	0.0		0.0	16.8	11.3	22.9	32.1	16.9		
×	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○			5.2904	0.9019	0.4549	0.1437				

Material Description

USCS

AASHTO

Silty sand with gravel

SM

Project No. 05-05-0013- Client: Black & Veatch

Project: E.A.A (Reservoir)W/O#6

Remarks:

Moisture Content % 14.7 CB05-
EAARS-CB-0377

Source of Sample: CB281

Depth: 29.0'-30.5'

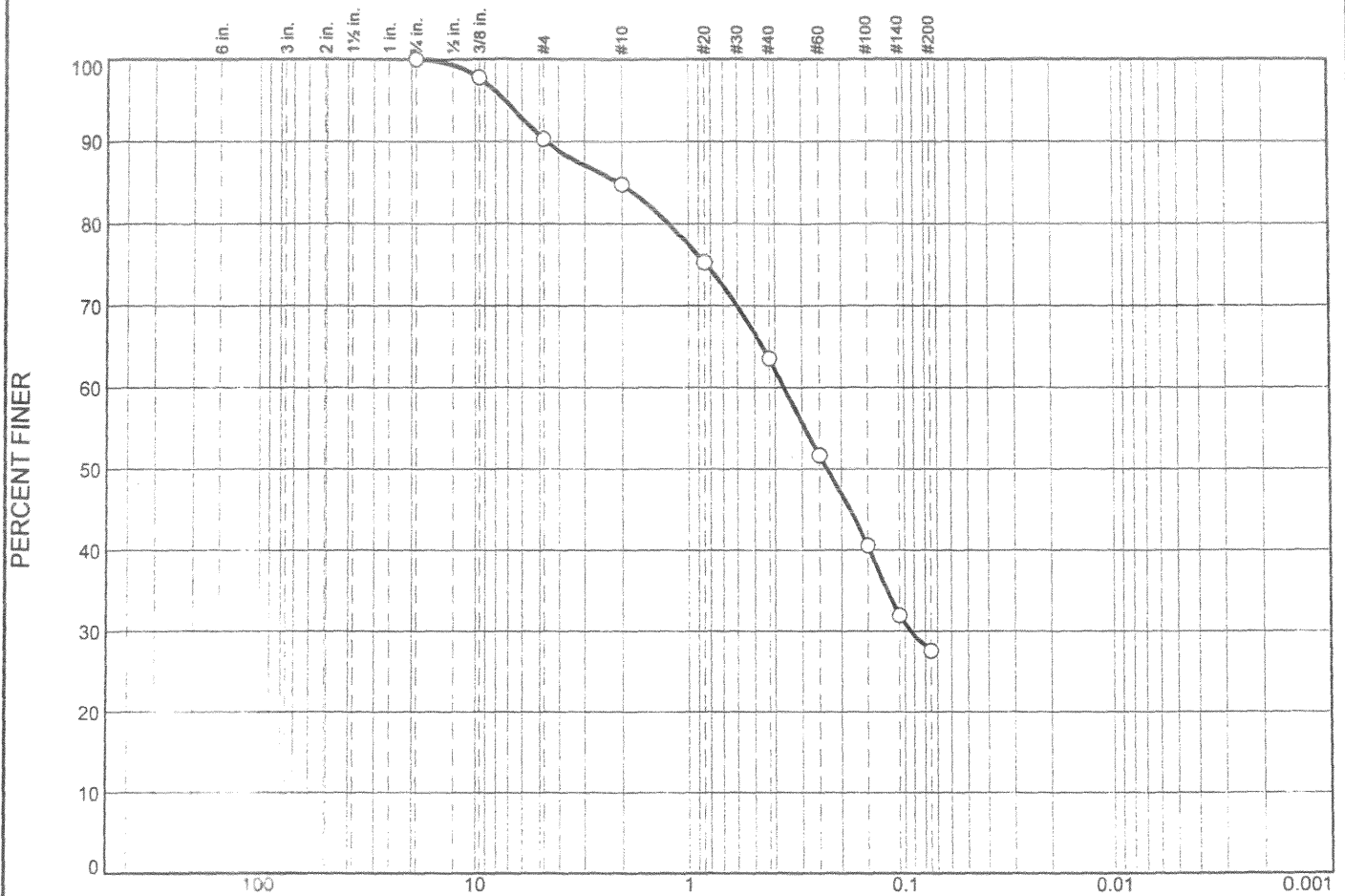
Sample Number: CB281

Nodarse & Associates, Inc.

Miami Lakes, FL

Figure

Particle Size Distribution Report



PERCENT FINER

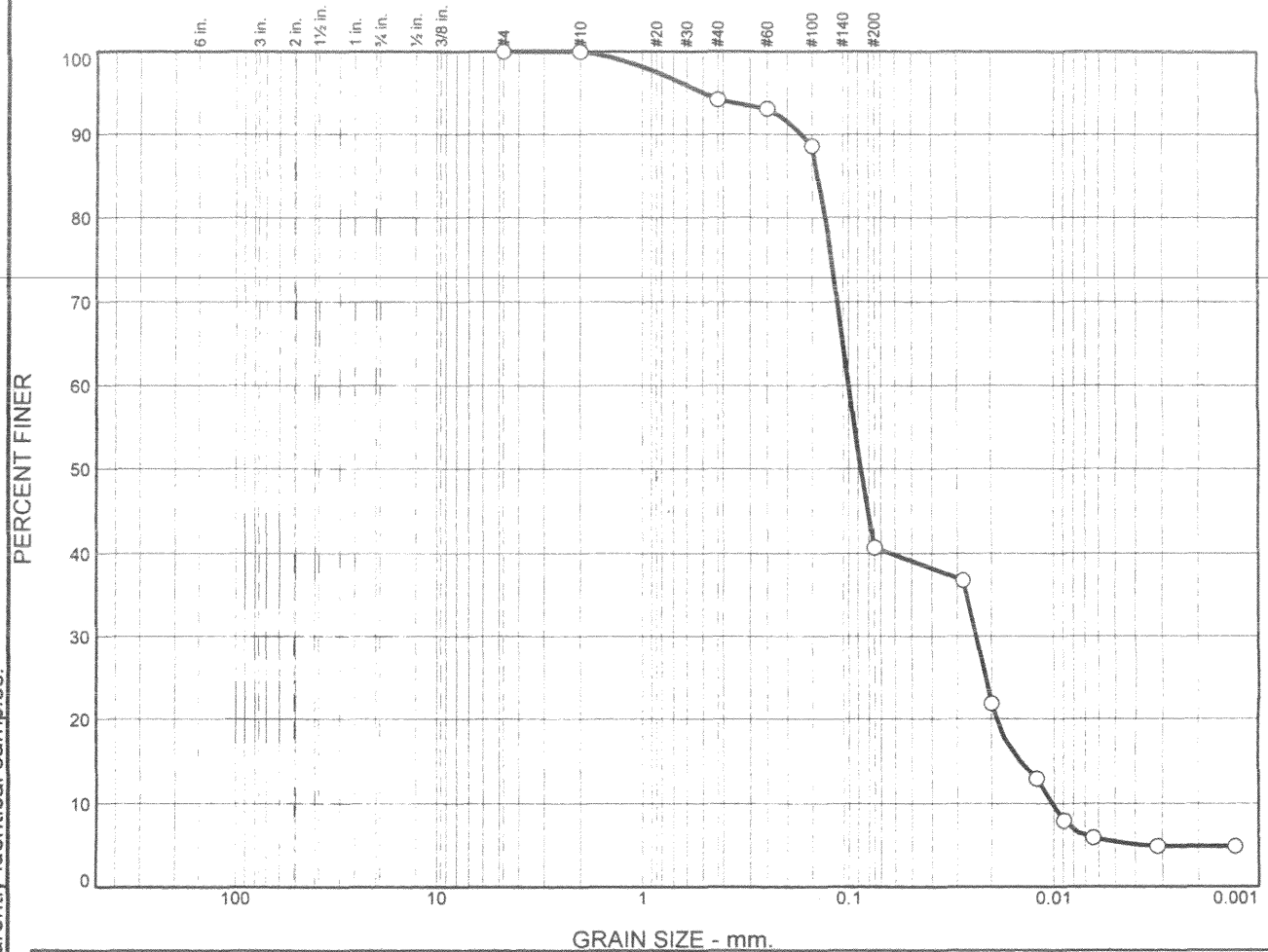
Sieve Size	Percent Finer (%)
6 in.	100
3 in.	100
1 1/2 in.	88
#4	73
#10	53
#20	40
#40	35
#60	31
#100	21
#140	12
#200	9

GRAIN SIZE - mm.

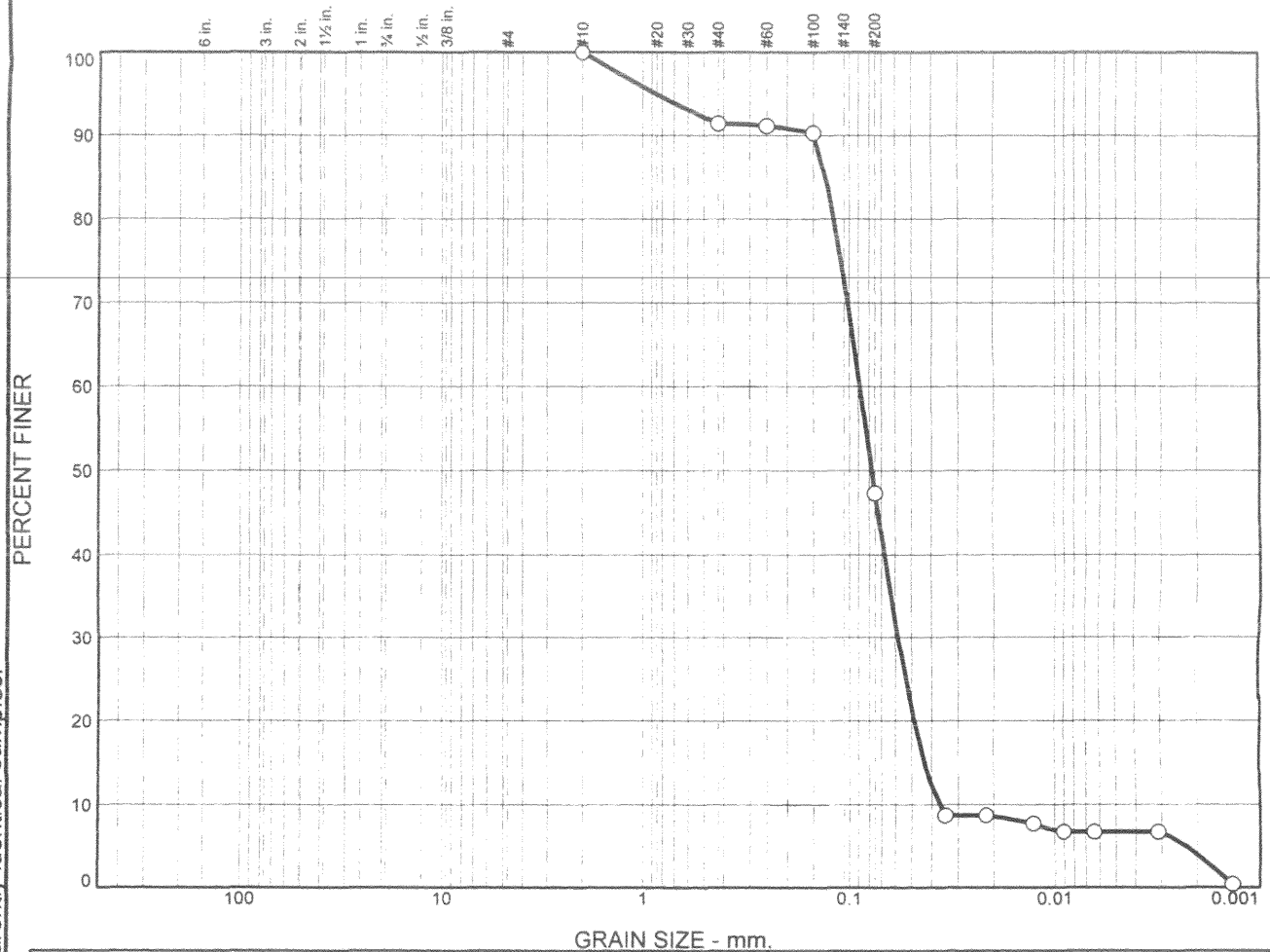
Project No. 05-05-0013- Client: Black & Veatch Project: E.A.A (Reservoir)W/O#6 ○ Source of Sample: CB310 Depth: 33.5'-35.0' Sample Number: CB310	Remarks: ○ Moisture Content % 12.8 CP05- EAARS-CB-0406
<p style="text-align: center;">Nodarse & Associates, Inc.</p> <p style="text-align: center;">Miami Lakes, FL</p>	

Figure

Particle Size Distribution Report



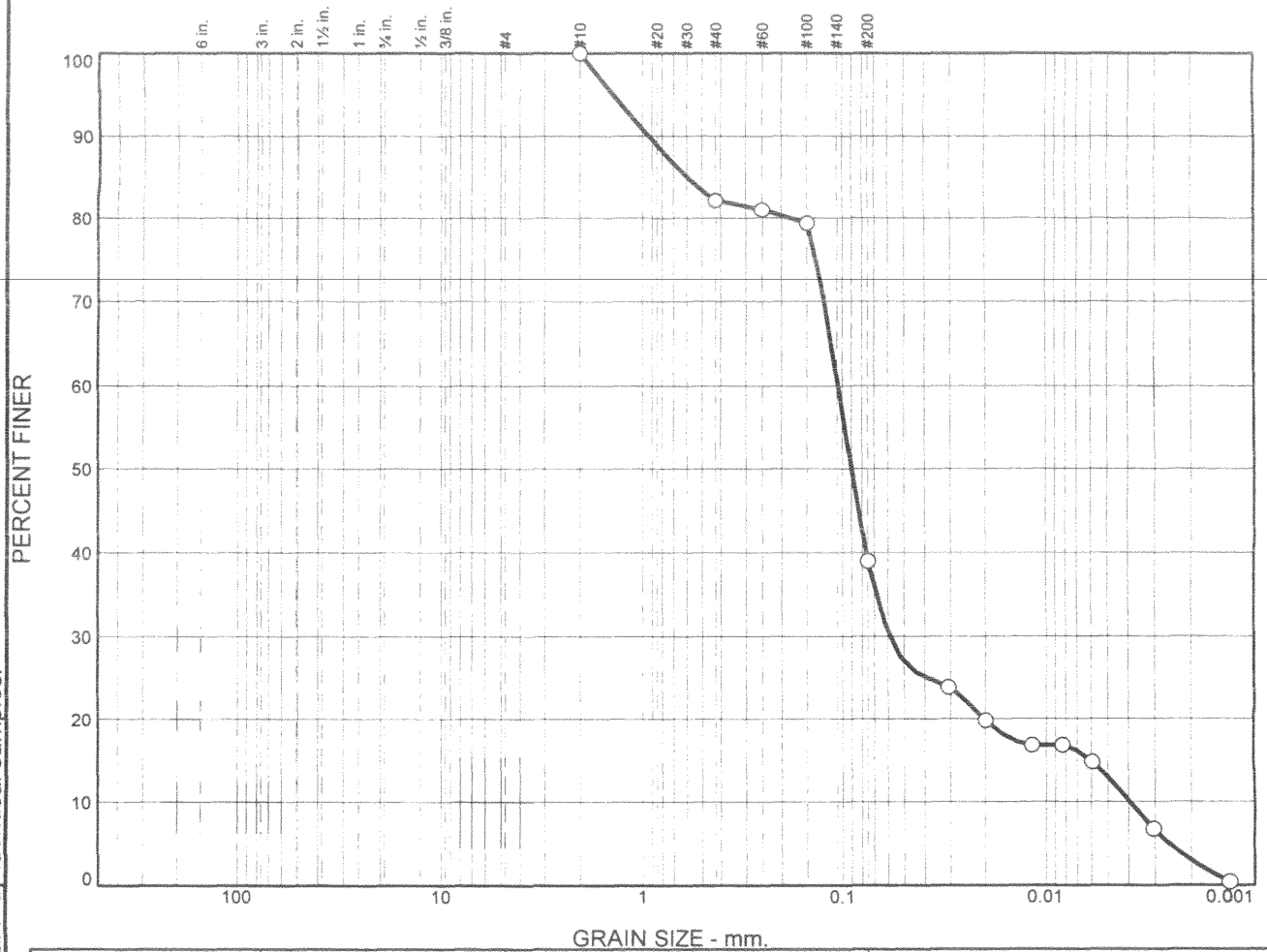
Particle Size Distribution Report



These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicative of apparently identical samples.

GRAIN SIZE - mm.									
% +3"		% Gravel		% Sand			% Fines		
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	
<input type="radio"/>	0	0	0	0	9	44	40	7	
<input checked="" type="radio"/>	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c
<input type="radio"/>	NL	NP	0.1304	0.0888	0.0777	0.0581	0.0433	0.0369	1.03
Material Description							USCS	AASHTO	
<input type="radio"/> SILTY SAND							SM		
Project No. 05-05-0013- Client: Black & Veatch							Remarks: <input type="radio"/> HYGROSCOPIC MOISTURE 2.63 % - NATURAL MOISTURE 27.7 % - CP05- EAARS VB 0285		
Project: E.A.A (Reservoir)W/O#6									
<input type="radio"/> Sample Source: CB190 HYD Depth: 190'-195' Sample No.: 39									
Nodarse & Associates, Inc.									
Miami Lakes, FL							Figure HYDROMETER		

Particle Size Distribution Report



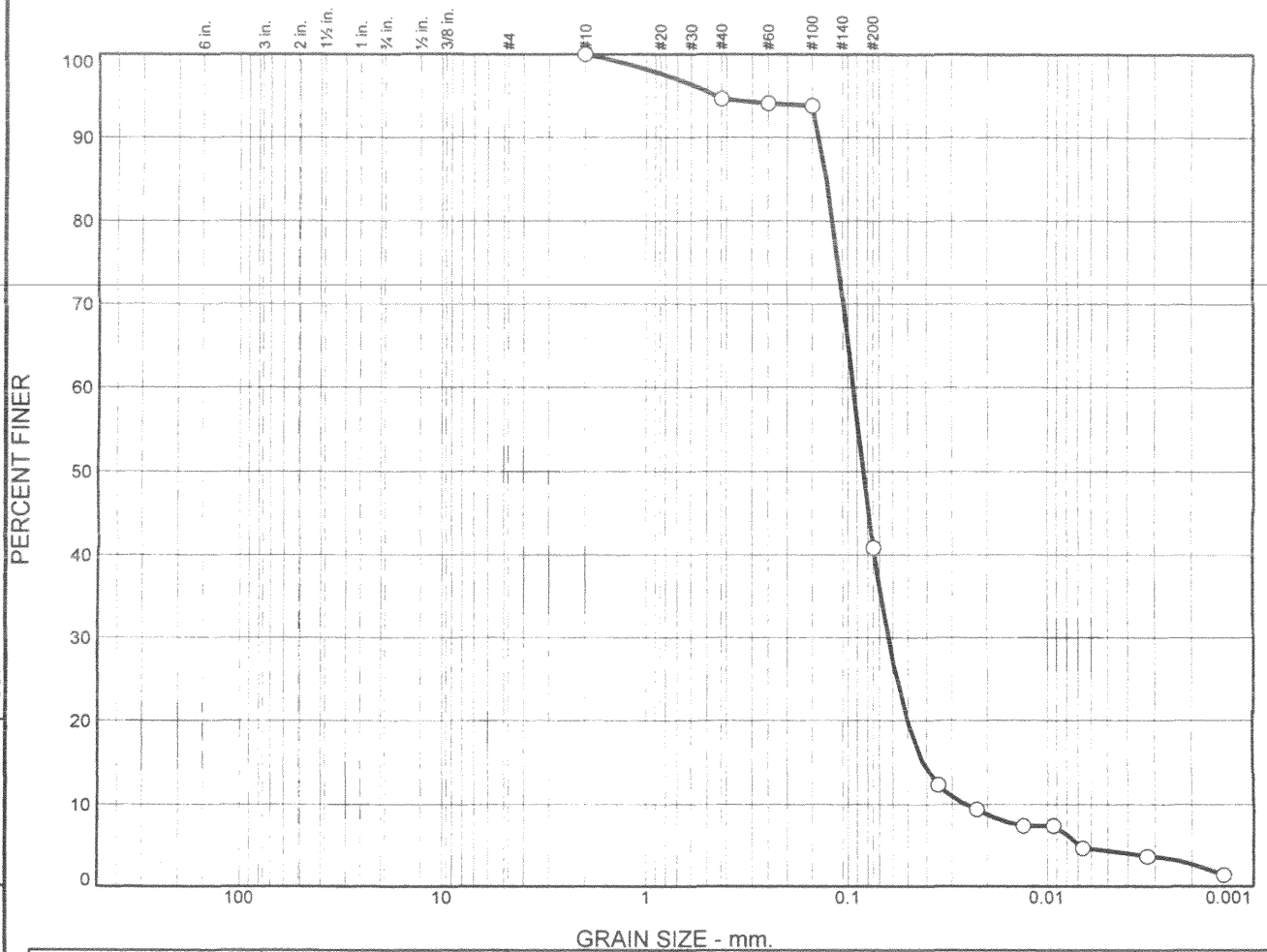
GRAIN SIZE - mm.									
% +3"		% Gravel		% Sand			% Fines		
		Coarse	Fine	Coarse	Medium	Fine	Silt		Clay
0		0	0	0	18	43	26		13
LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
	NP	0.5911	0.1047	0.0903	0.0587	0.0061	0.0040	8.30	26.43
Material Description								USCS	AASHTO
SILTY SAND								SM	
Project No. 05-05-0013- Client: Black & Veatch Project: E.A.A (Reservoir)W/O#6 Sample Source: CB190 HYD Depth: 205'-210' Sample No.: 44								Remarks: ○HYGROSCOPYC MOISTURE 4.0 %-NATURAL MOISTURE 31.8 %-CP05-EAARS-VB-0285.	
Nodarse & Associates, Inc.									
Miami Lakes, FL								Figure HYDROMETER	

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicative of apparently identical samples.

Tested By: CAMARAZA

Checked By: MAZO

Particle Size Distribution Report



GRAIN SIZE - mm.										
% +3"			% Gravel		% Sand			% Fines		
			Coarse	Fine	Coarse	Medium	Fine	Silt		Clay
○	0		0	0	0	5	54	37		4
×	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○	NL	NP	0.1272	0.0941	0.0840	0.0634	0.0415	0.0255	1.67	3.69

Material Description							USCS	AASHTO
SILTY SAND							SM	

Project No. 05-05-0013- Client: Black & Veatch Project: E.A.A (Reservoir)W/O#6			Remarks: ○HYGROSCOPYC MOISTURE .6 %-NATURAL MOISTURE 34.4 %-CP05-EAARS-VB-0285.
Sample Source: CB190 HYD	Depth: 210'-215'	Sample No.: 43	
Nodarse & Associates, Inc. Miami Lakes, FL			

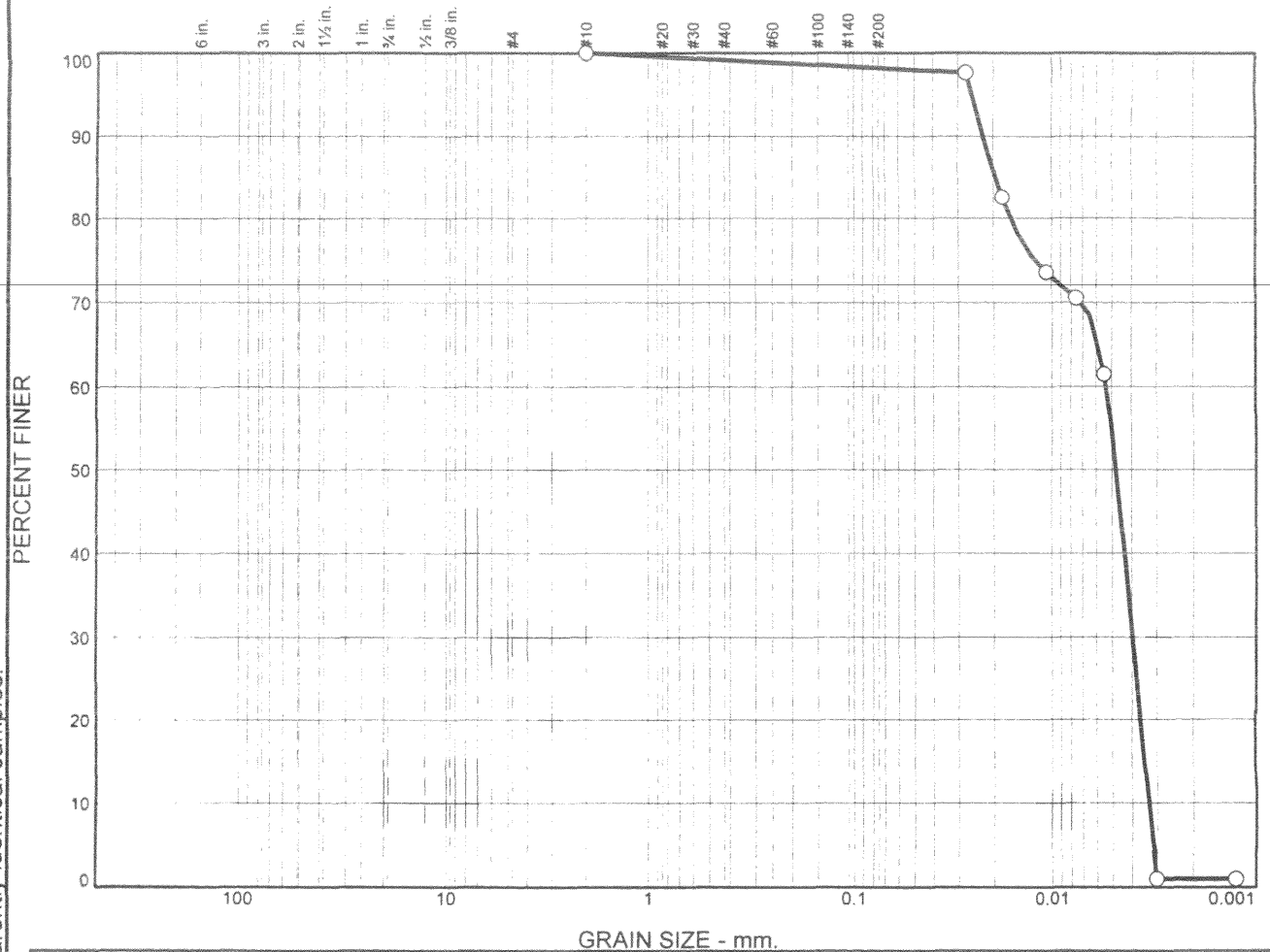
Figure

Tested By: CAMARAZA

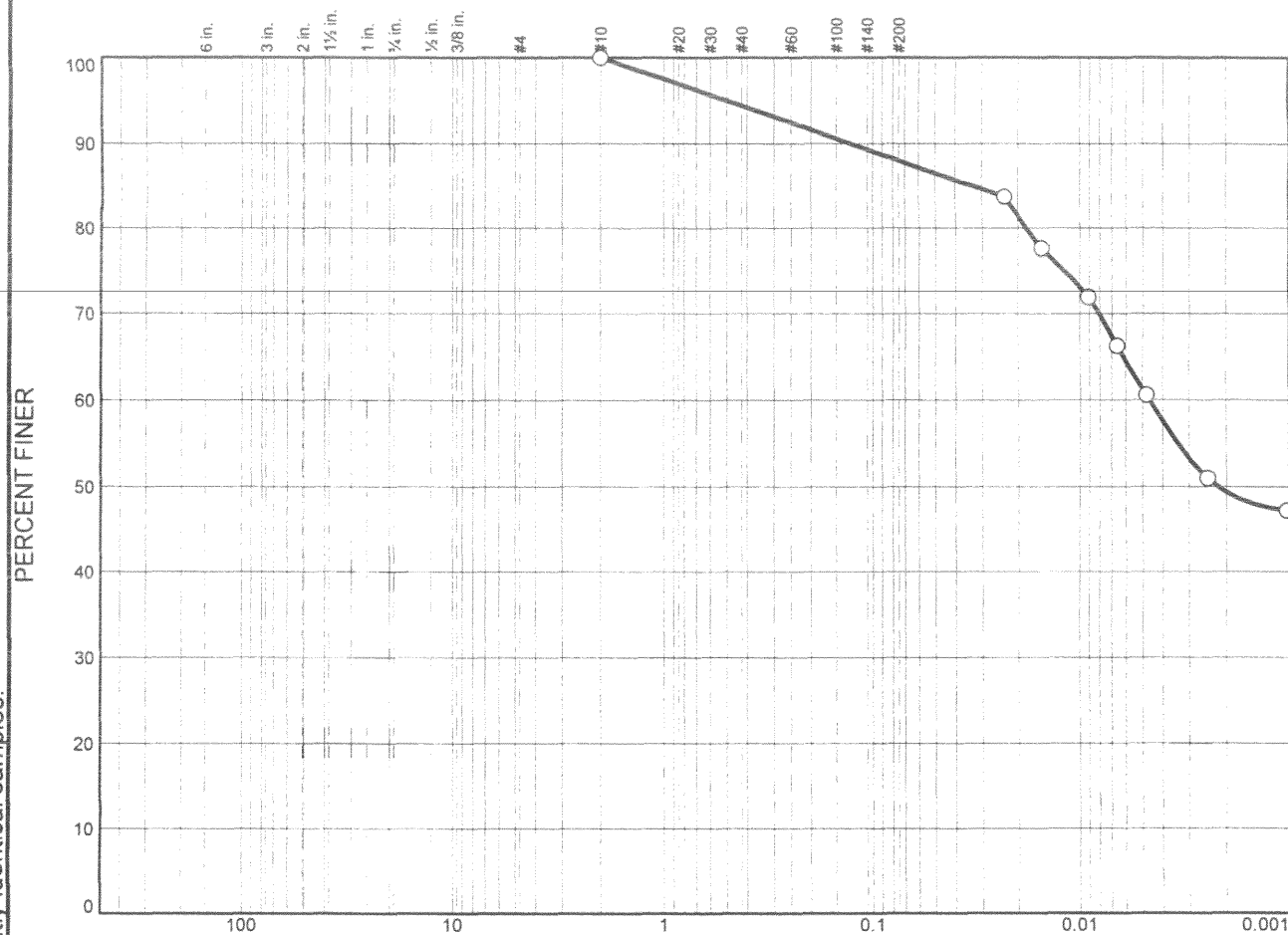
Checked By: MAZO

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicative of apparently identical samples.

Particle Size Distribution Report



PERCENT FINER



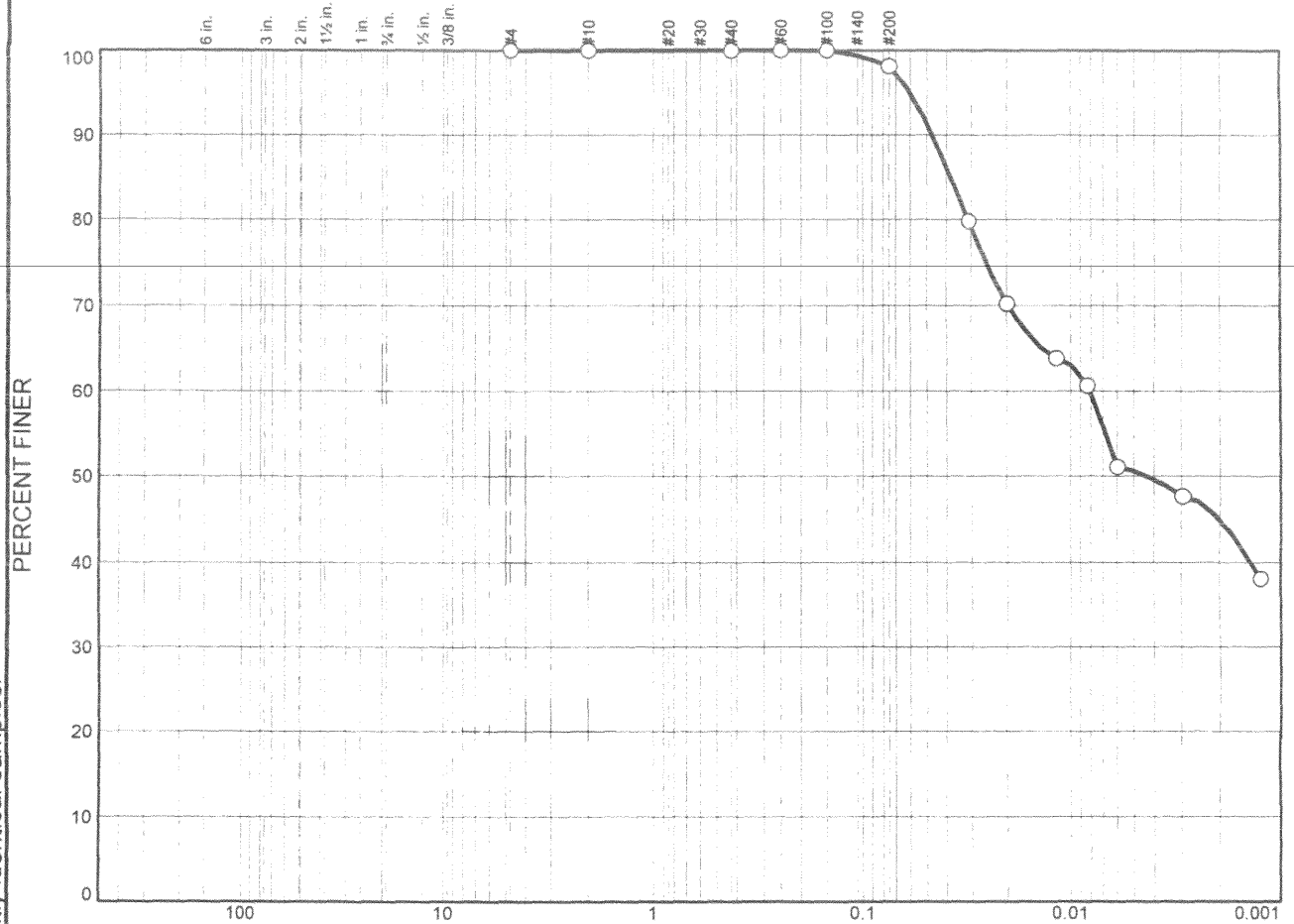
GRAIN SIZE - mm.										
% +3"		% Gravel		% Sand			% Fines			
		Coarse	Fine	Coarse	Medium	Fine	Silt		Clay	
○	0	0	0	0	6	6	27		61	
×	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○			0.0324	0.0046	0.0022					
Material Description								USCS	AASHTO	
○ SANDY ELASTIC SILT -With green glauconite colour								MH		
Project No. 05-05-0013- Client: Black & Veatch								Remarks: ○HYGROSCOPIC MOISTURE 9.6% - NATURAL MOISTUR CONTENT 101.4 % -CP05- EAARS-VB-0285-Insufficient sample for Atteberg limits.		
Project: E.A.A (Reservoir)W/O#6										
○ Source of Sample: CB190 HYD Depth: 225' Sample Number: 15E										
Nodarse & Associates, Inc.										
Miami Lakes, FL								Figure 1 HYDROMETER		

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicative of apparently identical samples.

Figure HYDROMETER

Checked By: MAZO

Particle Size Distribution Report



These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicative of apparently identical samples.

GRAIN SIZE - mm.									
% +3"		% Gravel		% Sand			% Fines		
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	
<input type="radio"/>	0	0	0	0	0	2	47	51	
<input checked="" type="checkbox"/>	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c
<input type="radio"/>	126	62	0.0381	0.0081	0.0043				
Material Description							USCS	AASHTO	
<input type="radio"/> SANDY ELASTIC SILT. With green glauconite colour							MH		
Project No. 05-05-0013- Client: Black & Veatch Project: E.A.A (Reservoir)W/O#6 <input type="radio"/> Sample Source: CB190 HYD Depth: 245'-250' Sample No.: 50							Remarks: <input type="radio"/> HYGROSCOPYC MOISTURE 2.3 % -NATURAL MOISTURE 151.2 % -CP05-EAARS-VB-0285		
Nodarse & Associates, Inc. Miami Lakes, FL									

Figure 1 HYDROMETER

APPENDIX 5

LABORATORY TEST RESULTS

ROCK QUALITY TESTS

APPENDIX 5

LABORATORY TEST RESULTS

ROCK QUALITY TESTS

EAA Reservoir
 Project 05 05 0013 016A
 Work Order No: 4

Compressive Strength of Rock Cores

Core Identification	Core Depth (feet)	Compressive Strength (psi)
CB-0158	1.0-5.5	2600
CB-0159	4.75-9.75	1250
CB-0161	4.5-8.0	1430
CB-0163	5.5-10.5	4340
CB-0165	6.5-11.5	3690
CB-0167	6.5-11.5	1530
CB-0172	2.5-7.5	1570
CB-0173	5.0-5.5	1860
CB-0175	3.5-6.5	4620
CB-0176	1.0-5.0	2650
CB-0177	4.5-9.5	3090
CB-0178	9.5-12.0	433
CB-0179	0.4-3.5	1676
CB-0187	2.5-3	1105
CB-0187	25-30	2400
CB-0188	1.0-6.0	650
CB-0211	5.0-10.0	5200
CB-0212	10.0-15.0	2710
CB-0212	3.0-3.5	5920
CB-0184	4-9	1870

Notes:

- 1 Core compressive strength determined in general accordance with ASTM D2938

EAA Reservoir
 Project 05 05 0013 016A
 Work Order No: 6

Compressive Strength of Rock Cores

CPUS - EARS - CB

Core Identification	Core Depth (feet)	Compressive Strength (psi)
CB-0248 <i>-0346</i>	5.0-10.0	5010
CB-0260 <i>-0358</i>	8.5-13.0	2500
CB-0268 <i>-0365</i>	6.5-11.5	1500
CB-0276 <i>-0372</i>	4.0-9.0	3570
CB-0276 <i>-0372</i>	10.0-14.0	1570
CB-0277 <i>-0373</i>	4.5-9.5	1000
CB-0277 <i>-0373</i>	9.5-14.5	4430
CB-0281 <i>-0377</i>	5.5-10.5	3880
CB-0281 <i>-0377</i>	10.5-15.5	2250
CB-0302 <i>-0398</i>	7.0-12.0	2100
CB-0302 <i>-0398</i>	12.0-17.0	1040

Notes:

- Core compressive strength determined in general accordance with ASTM D2938

Date: 10/18/2005

Project No: 05-05-0013-101 W.O.#5

Project Name: EAA Reservoir

Requested by: Black & Veatch

Nodarse & Associates, Inc.

CP05-ETAR25-CB

Sample No.	Length(inches)	Avg Diameter(inches)	Load (lbs)	Strenght(psi)	Comments
CB-0162. 7-12 ft	-0266 4.83	2.48	47180	9768	
CB-0191. 9.6-10.9ft	-0290 4.83	2.48	4220	874	
CB-0191 24-29ft	-0290 4	2.48	10700	2215	
CB-0194 41.5-45.5ft	-0293 83	2.49	5120	1053	
CB-0204 10-15ft	-0303 4.86	2.49	41020	8389	
CB-0206 9.5-14.5ft	-0304 4.86	2.49	15530	3195	
CB-0208 8.25-11.0ft	-0306 4.86	2.49	39270	8080	
CB-0216 26.1-27ft	-0314 4.86	2.46	14090	2979	
CB-0216 32.9-34.1ft	-0314 4.73	2.49	23890	4916	
CB-0220 19.9-25ft	-0318 4.86	2.49	4650	960	
CB-0220 25.0-30.0ft	-0318 4.86	2.49	15040	3095	
CB-0222 17.5-18.1ft	-0320 4.86	2.49	7200	1481	
CB-0231 2.0-7.0ft	-0329 4.52	2.47	8440	1867	
CB-0292 0-5.0ft	-0388 4.79	2.47	10150	2119	
CB-0296 0-5.0ft	-0392 4.83	2.48	8720	1805	

Nodarse & Associates, Inc.

Date: 10/4/2005
 Project Name: EAA Reservoir A-1
 Project No: 05-05-0013-101 WO#5
 Tested by: Chris B
 Depth: See sample #
 Checked by: Chris B

ASTM D 6473-99 Test Method

Specific Gravity & Absorption
of Rock for Erosion Control

CP05-CHARRS-CBA

Sample No.	Wt. in H ₂ O (C) gr.	SSD Wt. (B) gr.	Oven Dry Wt. (A) gr.	Bulk Sp G.	Bulk (SSD) Sp. Gr.	Apparent Sp. Gr.	Absorption	Comments
CB-0191 24-29ft	320.1 -0296	544.1	516.8	2.31	2.43	2.63	5.26	
CB-0194 37.8-38.5ft	663.1 -0293	1157.8	1062	2.14	2.34	2.66	9.02	
CB-0201 10-10.7ft	958.1 -0300	1631.5	1555.2	2.31	2.42	2.61	7.96	
CB-0204 10-15ft	548.2 -0303	981.7	889.1	2.05	2.26	2.61	10.43	
CB-0208 8.25-11ft	815.2 -0306	1346.1	1310.8	2.47	2.53	2.64	2.69	
CB-0220 19.9-25ft	562.5 -0318	1023.5	889.2	1.93	2.22	2.72	15.1	
CB-0220 25-30.0ft	658.2 -0318	1142.6	1059.4	2.19	2.36	2.31	7.85	

Bulk spec. gravity = A/(B-C)

Bulk spec. gravity(SSD)=B/(B-C)

Apparent spec. gravity=A(A-C)

Absorption = [(B-A)/A]X100%

EAA Reservoir
 05 05 0013 106A
 Work Order No: 4
 Rock Core Specific Gravity and Absorption

CP05-EARRS-

	Core Identification	Core Depth (feet)	Bulk Specific Gravity	Bulk (SSD) Specific Gravity	Apparent Specific Gravity	Absorption (%)
CB-0312	CB-0214	32.5-33.2	1.501	1.600	1.680	7.38
CB-0324	CB-0226	4.74-9.75	2.340	2.440	2.600	4.35
CB-0324	CB-0226	16.0-21.0	2.390	2.460	2.560	2.90
CB-0325	CB-0227	5.75-10.75	2.400	2.480	2.600	3.27
CB-0326	CB-0228	6.5-11.5	2.204	2.360	2.610	7.11
CB-0326	CB-0228	17.5-22.5	2.010	2.210	2.550	11.0
CB-0287	CB-0187	2.5-3.0	2.000	2.210	2.550	10.97
CB-0289	CB-0189	20.5-25.5	2.460	2.550	2.700	3.56
CB-0309	CB-0211	5.0-10.0	2.460	2.510	2.585	1.83
CB-0310	CB-0212	10.0-15.0	1.740	1.890	2.030	8.41
CB-0310	CB-0212	30.0-35.0	2.960	3.140	3.600	6.10
CB-0311	CB-0213	23.5-28.5	1.910	2.170	2.570	13.28
CB-0274	CB-0178	9.5-12.0	2.260	2.350	2.500	4.10
CB-0275	CB-0179	0.4-5.5	2.400	2.500	2.680	4.44
CB-0276	CB-0180	1.0-4.5	2.240	2.340	2.501	4.70
CB-0279	CB-0184	4.0-9.0	2.220	2.370	2.603	6.70
CB-0287	CB-0187	25.0-30.0	2.470	2.520	2.601	2.05
CB-0288	CB-0188	1.0-6.0	2.330	2.460	2.670	5.40
CB-0267	CB-0170	6.0-9.5	2.320	2.450	2.660	5.35
CB-0269	CB-0172	2.5-7.5	2.520	2.600	2.730	3.10
CB-0270	CB-0173	5.0-8.5	2.350	2.420	2.550	3.32
CB-0271	CB-0175	3.5-6.5	2.620	2.680	2.700	2.10
CB-0272	CB-0176	1.0-5.0	2.400	2.500	2.700	4.65
CB-0273	CB-0177	4.5-9.5	2.140	2.240	2.380	4.73
CB-0256	CB-0158	1.0-5.5	2.410	2.500	2.621	3.30
CB-0257	CB-0159	4.75-9.75	2.030	2.190	2.410	7.71
CB-0259	CB-0161	4.5-8.0	1.440	1.850	2.480	29.5

Notes:

- Specific Gravity and Absorption determined in general accordance with ASTM D6473-99.

CP05-ETARS -

Notes:

July 2014

EAA Reservoir
 05 05 0013 106A
 Work Order No: 6
 Rock Core Specific Gravity and Absorption

CP05- EARS - CB

Core Identification	Core Depth (feet)	Bulk Specific Gravity	Bulk (SSD) Specific Gravity	Apparent Specific Gravity	Absorption (%)
CB-0248-0346	5.0-10.0	2.42	2.49	2.60	2.90
CB-0260-0358	2.0-7.0	2.40	2.50	2.50	1.51
CB-0260-0358	8.5-13.0	2.17	2.30	2.50	6.10
CB-0268-0365	6.5-11.5	1.84	2.13	2.60	16.00
CB-0276-0372	4.0-9.0	2.17	2.34	2.60	7.87
CB-0276-0372	10.0-14.0	2.36	2.45	2.60	3.97
CB-0277-0373	4.5-9.5	2.23	2.37	2.60	6.20
CB-0277-0373	9.5-14.5	2.23	2.39	2.70	7.10
CB-0281-0377	5.5-10.5	2.19	2.33	2.60	6.78
CB-0281-0377	10.5-15.5	2.47	2.51	2.60	1.87
CB-0302-0398	7.0-12.0	2.04	2.20	2.40	7.90
CB-0302-0398	12.0-17.0	2.15	2.32	2.60	8.04

Notes: Specific Gravity and Absorption determined in general accordance with ASTM D6473-99.

Nodarse & Associates, Inc.

Date: 10/19/2005
 Project Name: EAA Reservoir A-1
 Project No: 05-05-0013-101 WO#4
 Tested by: Chris B
 Depth: See sample #
 Checked by: Chris B

ASTM D 6473-99 Test Method

Specific Gravity & Absorption
of Rock for Erosion Control

Sample No.	Wt. in H ₂ O (C) gr.	SSD Wt. (B) gr.	Oven Dry Wt. (A) gr.	Bulk Sp G.	Bulk (SSD) Sp. Gr.	Apparent Sp. Gr.	Absorption	Comments
Rip Rap sample 1	411.1	700.7	680.1	2.35	2.42	2.53	3.02	
Rip Rap sample 2	350.3	587.7	569.9	2.4	2.48	2.59	3.12	
Rip Rap sample 3	447.3	763.4	741.7	2.35	2.42	2.52	2.93	

Bulk spec. gravity = A/(B-C)

Bulk spec. gravity(SSD)=B/(B-C)

Apparent spec. gravity=A(A-C)

Absorption = [(B-A)/A]X100%

EAA Reservoir A-1
Laboratory Work Order No. 4, Rip Rap Samples
Los Angeles Abrasion

Sample Number	1	2	3
Percent Wear	31.3	31.3	30.6
Grading	"A"	"A"	"A"

Note: Laboratory testing completed by Wingerter Laboratories Inc. of Miami Florida
Laboratory testing completed in accordance with ASTM C-131 & C-535.

EAA Reservoir A-1
Laboratory Work Order No. 4, Rip Rap Samples
Soundness of Rock

Sample Number	1	2	3
Percentage Loss	0%	0%	0%

Notes: Laboratory testing completed in general accordance with ASTM D5240.

APPENDIX 5

LABORATORY TEST RESULTS

CARBONATE CONTENT

**LABORATORY TEST RESULTS FOR
EAA RESERVOIR A-1**
Nodarse & Associates, Inc. Project No. 05-05-0013

Boring Number	Sample Depth (ft)	Carbonate Content (%)
TC1-N-2	8.5	79.0
TC1-N-12	58.5	63.2
TC1-N-16	78.5	45.9
TC1-E-3	9.0	82.3
TC1-E-7	28.5	14.5
TC1-E-14	63.5	41.6
TC1-E-16	73.5	69.1
TC1-W-4	18.5	91.9
TC1-W-7	33.5	56.5
TC1-W-15	73.5	65.0
TC1-W-20	98.5	67.7
TC1-S-4	18.5	87.1
TC1-S-9	43.5	25.3
TC1-S-15	73.5	68.9
TC1-S-16	78.5	67.8
TC1-S-8	38.5	40.7

EAA Reservoir
05 05 0013 106A
Work Order No. 3
Carbonate Test Data

CB-0266

Boring Number	Depth (feet)	Carbonate Content (%)
CB 169 CP05-EPARS	5.5-8.5	76.6
CB 17 CP05-EPARS CB-0268	7.0-10.0	81.6
CB 175 CP05-EPARS CB-0271	13.5-15.0	81.8
CB 186 CP05-EPARS CB-0281	33.5-35.0	34.7

227

TC-2 S 4
11.0'

Project Name: EAA
 Project No: _____
 Date: 2 21



Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

89.5 %

Crucible Number:	T	
Wt. of Crucible:	B	72.7778
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	72.8828
Insoluble Residue: A-B = R	R	0.1050

C = % of Carbonates of Calcium and Magnesium
 W = Mass Of Sample
 R = Insoluble Residue

Carbonate Range:

90% and up \pm 0.4%
 50% and up \pm 0.9%

F&R

33.5'

Project Name: EAA
 Project No: _____
 Date: 7-2-1



Carbonates

$$C = \frac{(W-R)}{W} \times 100 \quad \underline{23.3} \quad \%$$

Crucible Number:		105
Wt. of Crucible:	B	76.4745
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	77.2415
Insoluble Residue: $A-B = R$	R	0.7670

C = % of Carbonates of calcium and Magnesium
 W = Mass Of Sample
 R = Insoluble Residue

Carbonate Range:

90% and up $\pm 0.4\%$
 50% and up $\pm 0.9\%$

305

11.0'



Project Name: EAA
 Project No: _____
 Date: 2 21

Carbonates

$$C = \frac{(W-R)}{W} \times 100 \quad \underline{78.6} \quad \%$$

Crucible Number:		500
Wt. of Crucible:	B	70.8534
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	71.0673
Insoluble Residue: $A-B = R$	R	0.2139

C = % of Carbonates of Calcium and Magnesium

W = Mass Of Sample

R = Insoluble Residue

Carbonate Range:

90% and up $\pm 0.4\%$

50% and up $\pm 0.9\%$

234

TC-265
18.5

Project Name: EAA
 Project No: _____
 Date: 2 21



Carbonates

$$C = \frac{(W-R)}{W} \times 100 \quad \underline{80.6} \quad \%$$

Crucible Number:	C	
Wt. of crucible:	B	75.5465
Mass of sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	75.7410
Insoluble Residue: A-B = R	R	0.1945

C = % of Carbonates of Calcium and Magnesium

W = Mass Of Sample

R = Insoluble Residue

Carbonate Range:

90% and up \pm 0.4%

50% and up \pm 0.9%

234

TC-2 E S
18.5'

Project Name: EAA
 Project No: _____
 Date: 2 21



Carbonates

$$C = \frac{(W-R)}{W} \times 100 \quad \underline{80.6} \quad \%$$

Crucible Number:	C	
Wt. of Crucible:	B	75.5465
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	75.7410
Insoluble Residue: A-B = R	R	0.1945

C = % of Carbonates of Calcium and Magnesium
 W = Mass Of Sample
 R = Insoluble Residue

Carbonate Range:

90% and up $\pm 0.4\%$
 50% and up $\pm 0.9\%$

227

TC-2 S 4
11.0'

Project Name: EAA
Project No: _____
Date: 2 21



Carbonates

$$C = \frac{(W-R)}{W} \times 100 \quad \underline{\quad 89.5 \quad} \%$$

Crucible Number:	T	
Wt. of crucible:	B	72.7778
Mass of sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	72.8828
Insoluble Residue: $A-B = R$	R	0.1050

C = % of Carbonates of Calcium and Magnesium
W = Mass Of Sample
R = Insoluble Residue

Carbonate Range:

90% and up \pm 0.4%
50% and up \pm 0.9%

FER

TC-2 W 8

33.5'

Project Name: EAA

Project No: _____

Date: 7-2-1

Carbonates

$$C = \frac{(W-R)}{W} \times 100 \quad \underline{23.3} \quad \%$$

Crucible Number:	105	
Wt. Of Crucible:	B	76.4745
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	77.2415
Insoluble Residue: $A-B = R$	R	0.7670

C = % of Carbonates of Calcium and Magnesium
 W = Mass Of Sample
 R = Insoluble Residue

Carbonate Range:

90% and up $\pm 0.4\%$
 50% and up $\pm 0.9\%$

305

TC-2 W 3

11.0'

Project Name: EAA

Project No: _____

Date: 2 21

Carbonates

$$C = \frac{(W-R)}{W} \times 100 \quad \underline{78.6} \quad \%$$

Crucible Number:	500	
Wt. of Crucible:	B	70.8534
Mass of sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	71.0673
Insoluble Residue: $A - B = R$	R	0.2139

C = % of Carbonates of Calcium and Magnesium

W = Mass Of Sample

R = Insoluble Residue

Carbonate Range:

90% and up \pm 0.4%50% and up \pm 0.9%

EAA Reservoir

05 05 0013 106A

Work Order No: 5

Carbonate Test Data

CP05 - EAA25 - VB

- 0283

Boring Number	Depth (feet)	Carbonate Content (%)
CB-0174	100-105	71.7
"	110-115	75.5
"	115-120	75.9
"	125-130	77.7
"	140-145	53.0
"	150-155	68.3
"	160-165	67.2
"	165-170	41.2
"	180-185	37.9
"	185-190	53.6
"	195-200	36.6
"	200-205	23.9
- 0283	205-210	30.5

Notes:

- Carbonate content determined in general accordance with FDOT Standard.

EAA Reservoir
 05 05 0013 106A
 Work Order No. 6
 Carbonate Test Data

0205-ETARS-VB-

	Boring Number	Depth (feet)	Carbonate Content (%)
0282	CB 164	55060	61.8
0282	CB 164	70-75	72.3
0282	CB 164	130-135	32.8
0282	CB 164	180-185	54.8
0284	CB 182	70-75	78.8
0284	CB 182	90-95	72.1
0284	CB 182	140-145	55.4
0284	CB 182	175-180	48.2
0286	CB 205	60-65	77.1
0286	CB 205	75-80	72.0
0286	CB 205	140-145	58.2
0286	CB 205	160-165	61.6

281

Project Name: EAA
 Project No: _____
 Date: _____



102

BA-01

5.5 - 7.0'

Carbonates

$$C = \frac{(W-R)}{W} \times 100 \quad \underline{\quad 87.4 \% \quad}$$

Crucible Number:		202
Wt. of Crucible:	B	18.3244
Mass of Sample:	W	1.6001
Crucible + Insoluble Residue After Burn:	A	18.4508
Insoluble Residue: $A - B = R$	R	0.1264

C = % of Carbonates of Calcium and Magnesium
 W = Mass Of Sample
 R = Insoluble Residue

Carbonate Range:

90% and up $\pm 0.4\%$
 50% and up $\pm 0.9\%$

Project Name: EAA
 Project No: _____
 Date: _____



BA-01
28.5 - 30.0'
Carbonates

$$C = \frac{(W-R)}{W} \times 100 \quad \underline{\quad 29.1 \quad \%}$$

Crucible Number:	C	
Wt. of Crucible:	B	75.5444
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	76.2531
Insoluble Residue: A-B = R	R	0.7087

C = % of Carbonates of Calcium and Magnesium
 W = Mass Of Sample
 R = Insoluble Residue

Carbonate Range:

90% and up \pm 0.4%
 50% and up \pm 0.9%

302

Project Name: EAA
 Project No: _____
 Date: _____



BA-01
43.5-45.0'
Carbonates

$$C = \frac{(W-R)}{W} \times 100 \quad \underline{10.9} \quad \%$$

Crucible Number:		203
Wt. of Crucible:	B	17.2999
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	18.1907
Insoluble Residue: $A - B = R$	R	0.8908

C = % of Carbonates of Calcium and Magnesium
 W = Mass Of Sample
 R = Insoluble Residue

Carbonate Range:

90% and up $\pm 0.4\%$
 50% and up $\pm 0.9\%$

Project Name: EAA
 Project No: _____
 Date: _____



BA-03
2.5 - 10.0'
Carbonates

$$C = \frac{(W-R)}{W} \times 100 \quad \underline{82.6 \%}$$

Crucible Number:		105
Wt. of Crucible:	B	25.8748
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	26.0486
Insoluble Residue: $A-B = R$	R	0.1738

C = % of Carbonates of Calcium and Magnesium
 W = Mass Of Sample
 R = Insoluble Residue

Carbonate Range:

90% and up $\pm 0.4\%$
 50% and up $\pm 0.9\%$

Project Name: EAA
 Project No: _____
 Date: _____



BA-03
29-30.5
Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

40.5 %

Crucible Number:	100	
Wt. of crucible:	B	26.1823
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	26.7771
Insoluble Residue: $A-B = R$	R	0.5948

C = % of Carbonates of Calcium and Magnesium
 W = Mass Of Sample
 R = Insoluble Residue

Carbonate Range:

90% and up $\pm 0.4\%$
 50% and up $\pm 0.9\%$

263

Project Name: EAA
 Project No: _____
 Date: _____



BA-03
43.5' - 45.0'
Carbonates

$$C = \frac{(W-R)}{W} \times 100 \quad \underline{\underline{37.3\%}}$$

Crucible Number:		105
Wt. Of Crucible:	B	25.8741
Mass of sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	26.5013
Insoluble Residue: $A-B = R$	R	0.6272

C = % of Carbonates of Calcium and Magnesium
 W = Mass Of Sample
 R = Insoluble Residue

Carbonate Range:

90% and up $\pm 0.4\%$
 50% and up $\pm 0.9\%$

Project Name: EAA
 Project No: _____
 Date: _____



101

BA-04
6.2'
Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

87.7%

Crucible Number:		203
Wt. of Crucible:	B	17.2991
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	17.4220
Insoluble Residue: $A - B = R$	R	0.1229

C = % of Carbonates of Calcium and Magnesium
 W = Mass Of Sample
 R = Insoluble Residue

Carbonate Range:

90% and up $\pm 0.4\%$
 50% and up $\pm 0.9\%$

800

Project Name: EAA
 Project No: _____
 Date: _____



BA-04
 18.5'
Carbonates

$$C = \frac{(W-R)}{W} \times 100 \quad \underline{82.7} \quad \%$$

Crucible Number:	B	
Wt. of Crucible:	B	76.4770
Mass of Sample:	W	1.0001
Crucible + Insoluble Residue After Burn:	A	76.6500
Insoluble Residue: A-B = R	R	0.1730

C = % of Carbonates of Calcium and Magnesium
 W = Mass Of Sample
 R = Insoluble Residue

Carbonate Range:

90% and up $\pm 0.4\%$
 50% and up $\pm 0.9\%$

Project Name: EAA
 Project No: _____
 Date: _____



BA-04
 33.5'
Carbonates

$$C = \frac{(W-R)}{W} \times 100 \quad \underline{\quad 31.4\% \quad}$$

Crucible Number:	101	
Wt. of Crucible:	B	25.2995
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	25.9857
Insoluble Residue: A-B = R	R	0.6862

C = % of Carbonates of Calcium and Magnesium
 W = Mass Of Sample
 R = Insoluble Residue

Carbonate Range:

90% and up \pm 0.4%
 50% and up \pm 0.9%

222

Project Name: EAA
 Project No: _____
 Date: _____



BA-05
28.5'
Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

36.8 %

Crucible Number:		100
Wt. of crucible:	B	26.1721
Mass of sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	26.8037
Insoluble Residue: $A-B = R$	R	0.6316

C = % of Carbonates of calcium and Magnesium
 W = Mass Of Sample
 R = Insoluble Residue

Carbonate Range:

90% and up $\pm 0.4\%$
 50% and up $\pm 0.9\%$

246

Project Name: EAA
 Project No: _____
 Date: _____



BA-05
 8.5'
Carbonates

$$C = \frac{(W-R)}{W} \times 100 \quad \underline{86.2} \%$$

Crucible Number:	101	
Wt. of Crucible:	B	25.3000
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	25.4383
Insoluble Residue: $A-B = R$	R	0.1383

C = % of Carbonates of Calcium and Magnesium
 W = Mass Of Sample
 R = Insoluble Residue

Carbonate Range:

90% and up $\pm 0.4\%$
 50% and up $\pm 0.9\%$

231

Project Name: EAA
 Project No: _____
 Date: _____



BA-05
 38.5'
Carbonates

$$C = \frac{(W-R)}{W} \times 100 \quad \underline{31.4} \quad \%$$

Crucible Number:		11
Wt. of Crucible:	B	29.4254
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	30.1114
Insoluble Residue: $A-B = R$	R	0.6860

C = % of Carbonates of Calcium and Magnesium
 W = Mass Of Sample
 R = Insoluble Residue

Carbonate Range:

90% and up $\pm 0.4\%$
 50% and up $\pm 0.9\%$

TT-6

Project Name: EAA
 Project No: _____
 Date: _____



BA-06
 6.0-7.5'

Carbonates

$$C = \frac{(W-R)}{W} \times 100 \quad \underline{84.7} \%$$

Crucible Number:		100
Wt. of Crucible:	B	26.1653
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	26.3184
Insoluble Residue: $A-B = R$	R	0.1531

C = % of Carbonates of Calcium and Magnesium
 W = Mass Of Sample
 R = Insoluble Residue

Carbonate Range:

90% and up $\pm 0.4\%$
 50% and up $\pm 0.9\%$

309
 Project Name: EAA
 Project No: _____
 Date: _____



BA-06
 28.5-30.0'
Carbonates

$$C = \frac{(W-R)}{W} \times 100 \quad \underline{27.6} \%$$

Crucible Number:	C	
Wt. Of Crucible:	B	75.5440
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	76.2680
Insoluble Residue: A-B = R	R	0.7240

C = % of Carbonates of Calcium and Magnesium
 W = Mass Of Sample
 R = Insoluble Residue

Carbonate Range:

90% and up $\pm 0.4\%$
 50% and up $\pm 0.9\%$

Project Name: EAA
 Project No: _____
 Date: _____



BA-06
48.5-50.0'
Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

34.6 %

Crucible Number:		102
Wt. of crucible:	B	25.6848
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	26.3388
Insoluble Residue: $A - B = R$	R	0.6540

C = % of Carbonates of Calcium and Magnesium
 W = Mass Of Sample
 R = Insoluble Residue

Carbonate Range:

90% and up $\pm 0.4\%$
 50% and up $\pm 0.9\%$

Project Name: EAA
 Project No: _____
 Date: _____



BA-07
6.0 - 7.5'
Carbonates

$$C = \frac{(W-R)}{W} \times 100 \quad \underline{83.0 \%}$$

Crucible Number:		204
Wt. of Crucible:	B	17.8940
Mass of sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	18.0643
Insoluble Residue: A-B = R	R	0.1703

C = % of Carbonates of Calcium and Magnesium
 W = Mass Of Sample
 R = Insoluble Residue

Carbonate Range:

90% and up $\pm 0.4\%$
 50% and up $\pm 0.9\%$

Project Name: EAA
 Project No: _____
 Date: _____



BA.07
18.5-20.0'
Carbonates

$$C = \frac{(W-R)}{W} \times 100 \quad \underline{84.8} \%$$

Crucible Number:		202
Wt. of crucible:	B	18.3399
Mass of sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	18.4918
Insoluble Residue: $A - B = R$	R	0.1519

C = % of Carbonates of Calcium and Magnesium
 W = Mass Of Sample
 R = Insoluble Residue

Carbonate Range:

90% and up $\pm 0.4\%$
 50% and up $\pm 0.9\%$

Project Name: EAA
 Project No: _____
 Date: _____



BA-07
38.5-40.0'
Carbonates

$$C = \frac{(W-R)}{W} \times 100 \quad \underline{\quad 28.5 \quad \%}$$

Crucible Number:	102	
Wt. of Crucible:	B	25.6892
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	26.4045
Insoluble Residue: $A - B = R$	R	0.7153

C = % of Carbonates of Calcium and Magnesium
 W = Mass Of sample
 R = Insoluble Residue

Carbonate Range:

90% and up \pm 0.4%
 50% and up \pm 0.9%

279

Project Name: EAA
 Project No: _____
 Date: _____



BA-08
 8.5 - 10.0'
Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

85.9 %

Crucible Number:		105
Wt. of Crucible:	B	25.8640
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	26.0054
Insoluble Residue: $A - B = R$	R	0.1414

C = % of Carbonates of Calcium and Magnesium
 W = Mass Of Sample
 R = Insoluble Residue

Carbonate Range:

90% and up \pm 0.4%
 50% and up \pm 0.9%

252

Project Name: EAA
 Project No: _____
 Date: _____



BA-08
 13.5 - 15.0' 100
Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

83.7 %

Crucible Number:	11	
Wt. of Crucible:	B	29.4172
Mass of Sample:	W	1.0600
Crucible + Insoluble Residue After Burn:	A	29.5807
Insoluble Residue: $A-B = R$	R	0.1635

C = % of Carbonates of Calcium and Magnesium
 W = Mass Of Sample
 R = Insoluble Residue

Carbonate Range:

90% and up \pm 0.4%
 50% and up \pm 0.9%

225

Project Name: EAA
 Project No: _____
 Date: _____



BA-08
 38.5-40.0
Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

32.0 %

Crucible Number:	101	
Wt. of Crucible:	B	25.2934
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	25.9733
Insoluble Residue: $A - B = R$	R	0.32.01

C = % of Carbonates of calcium and magnesium
 W = Mass Of Sample
 R = Insoluble Residue

Carbonate Range:

90% and up \pm 0.4%
 50% and up \pm 0.9%

301

Project Name: EAA
 Project No: _____
 Date: _____



BA-09

105

23.5-25.0'

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

78.5 %

Crucible Number:		204
Wt. of Crucible:	B	17.8684
Mass of Sample:	W	1.0001
Crucible + Insoluble Residue After Burn:	A	18.0836
Insoluble Residue: $A-B = R$	R	0.2150

C = % of Carbonates of Calcium and Magnesium

W = Mass Of Sample

R = Insoluble Residue

Carbonate Range:

90% and up \pm 0.4%

50% and up \pm 0.9%

255

Project Name: EAA
 Project No: _____
 Date: _____



BA.09
38.5-40.0'
Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

25.3 %

Crucible Number:	T	
Wt. of Crucible:	B	1.0001
Mass of Sample:	W	72.7716
Crucible + Insoluble Residue After Burn:	A	73.5187
Insoluble Residue: $A - B = R$	R	0.7471

C = % of Carbonates of Calcium and Magnesium
 W = Mass Of Sample
 R = Insoluble Residue

Carbonate Range:

90% and up \pm 0.4%
 50% and up \pm 0.9%

Project Name: EAA
 Project No: _____
 Date: _____



BA-10
13.5-15.0'
Carbonates

$$C = \frac{(W-R)}{W} \times 100 \quad \underline{\underline{83.5}} \%$$

Crucible Number:	A	
Wt. of Crucible:	B	75.0438
Mass of sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	75.2091
Insoluble Residue: $A-B = R$	R	0.1653

C = % of Carbonates of calcium and Magnesium
 W = Mass Of Sample
 R = Insoluble Residue

Carbonate Range:

90% and up $\pm 0.4\%$
 50% and up $\pm 0.9\%$

Project Name: EAA
 Project No: _____
 Date: _____



241

BA-10
 33.5-35.0'

Carbonates

$$C = \frac{(W-R)}{W} \times 100$$

26.7 %

Crucible Number:		102
Wt. of Crucible:	B	25.6924
Mass of Sample:	W	1.0000
Crucible + Insoluble Residue After Burn:	A	26.4250
Insoluble Residue: A-B = R	R	0.7326

C = % of Carbonates of Calcium and Magnesium
 W = Mass Of Sample
 R = Insoluble Residue

Carbonate Range:

90% and up \pm 0.4%
 50% and up \pm 0.9%

APPENDIX 5

LABORATORY TEST RESULTS

OTHER TESTS

TRIAXIAL TEST RESULTS

Note: Material for triaxial tests on remolded samples was obtained from soil used in Test Cell construction.

EAA Reservoir
05 05 0013 106A
Work Order No: 5
Corrosion Test Data

CP05-EAARS-VB-1

✓

-0283

-0283

Boring Number	Depth (feet)	Electrical Resistivity (ohm-cm)	pH	Chlorides (ppm)	Sulfates (ppm)
CB-0174	5-10	8.2 x 1k	8.5	60	25
CB-0174	115-120	3.0 x 1k	8.3	60	Less than 5

Notes:

- 1 Corrosion Series determined in general accordance with FDOT Standards.

EAA Reservoir

05 05 0013 106A

Work Order No: 6

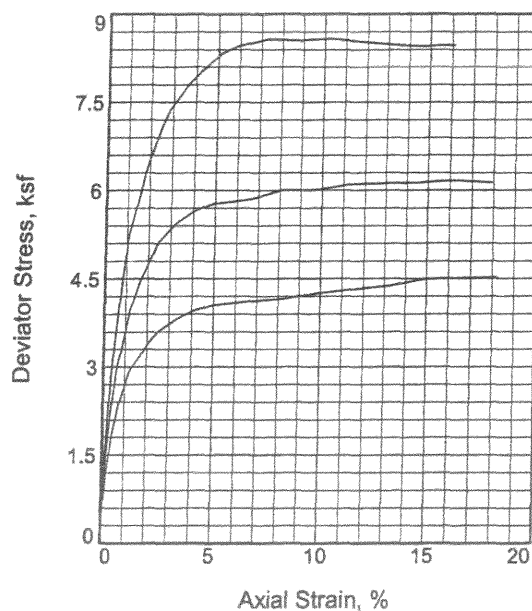
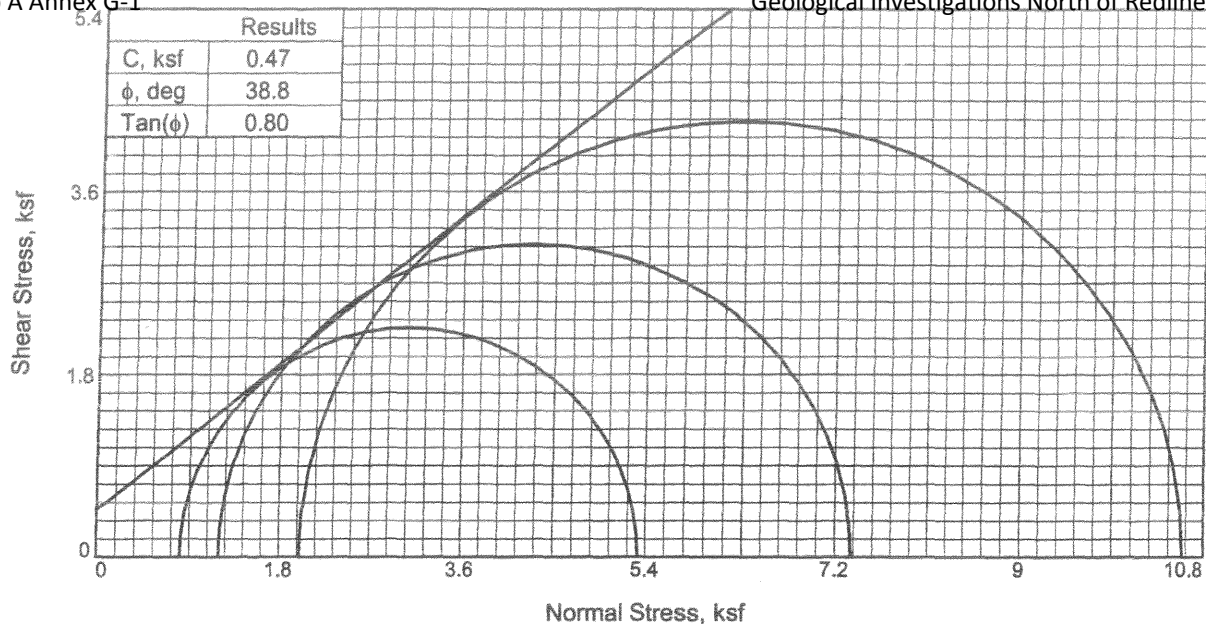
Corrosion Test Data

Boring Number	Depth (feet)	Electrical Resistivity (ohm-cm)	pH	Chlorides (ppm)	Sulfates (ppm)
CB-0164	5-10	6.1 x 1k	8.9	90	60

↑ CP05 - EARS - CB - 0361

Notes:

- 1 Corrosion Series determined in general accordance with FDOT Standards.



Sample No.		1	2	3
Initial	Water Content,	15.9	16.2	15.8
	Dry Density, pcf	104.4	107.4	107.3
	Saturation,	67.4	74.0	71.9
	Void Ratio	0.6508	0.6047	0.6066
	Diameter, in.	2.84	2.84	2.84
	Height, in.	6.05	6.15	6.83
At Test	Water Content,	22.8	21.7	21.9
	Dry Density, pcf	105.8	107.8	107.5
	Saturation,	100.0	100.0	100.0
	Void Ratio	0.6304	0.6000	0.6044
	Diameter, in.	2.83	2.84	2.84
	Height, in.	6.02	6.14	6.83
Strain rate, in./min.		0.05	0.05	0.05
Back Pressure, ksf		0.0	0.0	0.0
Cell Pressure, ksf		0.8	1.2	2.0
Fail. Stress, ksf		4.5	6.2	8.6
Ult. Stress, ksf				
σ_1 Failure, ksf		5.3	7.4	10.6
σ_3 Failure, ksf		0.8	1.2	2.0

Type of Test:

Unconsolidated Undrained

Sample Type: remold

Description: Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments

Specific Gravity= 2.762

Remarks: sample moist cured 14 days

Client: Nodarse and Associates**Project:** Material Testing-Nodarse**Sample Number:** UU-95% 14 day cured

Proj. No.: 6738-05-4573

Date: 6-28-05

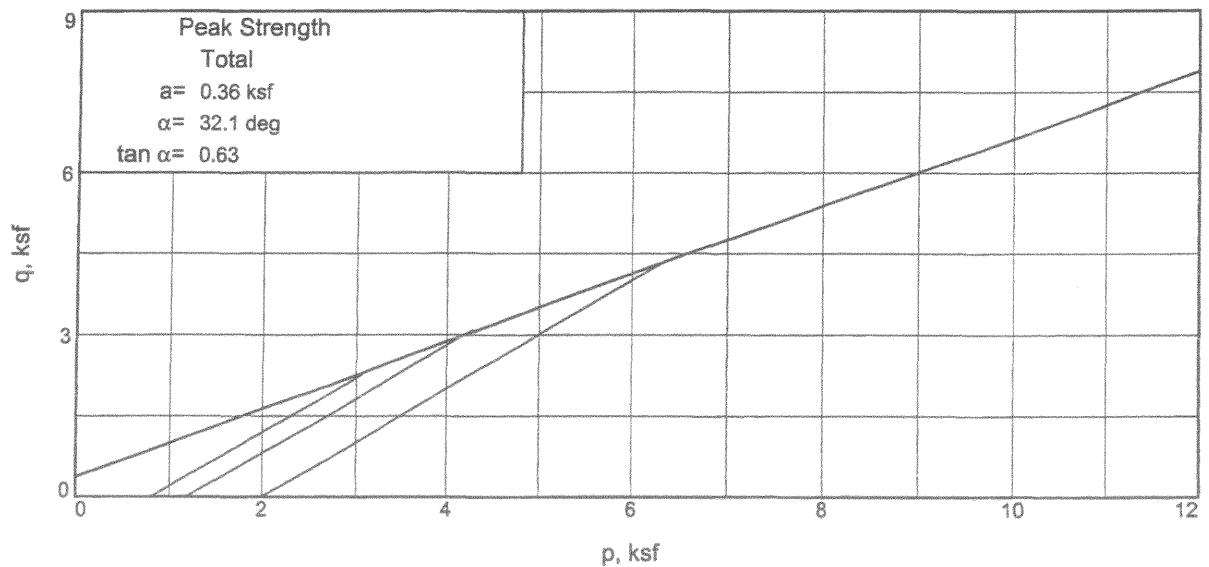
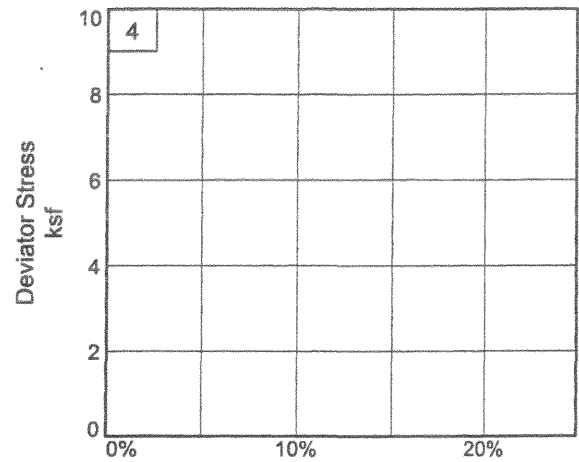
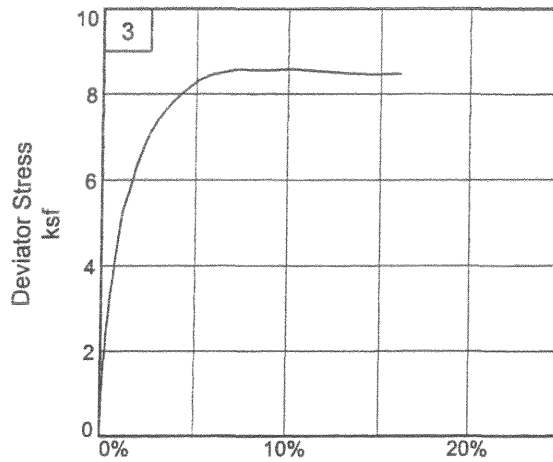
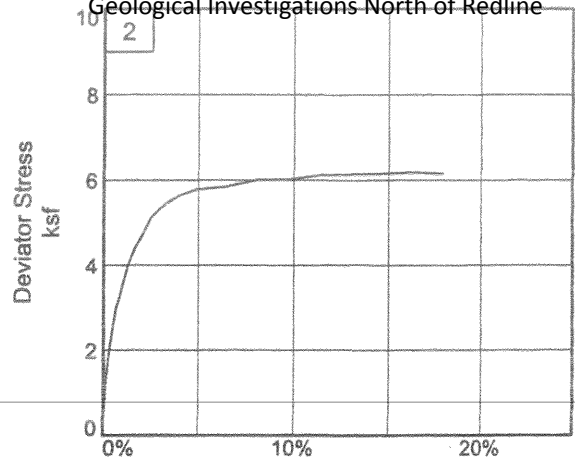
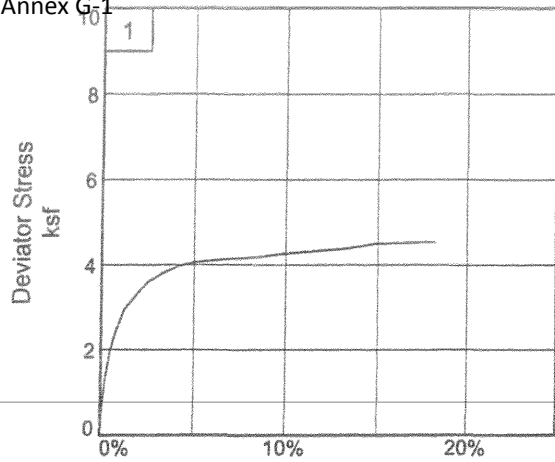
TRIAXIAL SHEAR TEST REPORT

MACTEC ENGINEERING AND CONSULTING, INC.

Reviewed By _____

Tested By: MC

Checked By: Rajni Sukhwani



Client: Nodarse and Associates

Project: Material Testing-Nodarse

Sample Number: UU-95% 14 day cured

Project No.: 6738-05-4573

Reviewed By _____

MACTEC Engineering and Consulting, Inc.

Tested By: MC _____ Checked By: _____

TRIAXIAL COMPRESSION TEST

Unconsolidated Undrained

7/14/2005

9:00 AM

Date: 6-28-05
Client: Nodarse and Associates
Project: Material Testing-Nodarse
Project No.: 6738-05-4573
Sample Number: UU-95% 14 day cured
Description: Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments
Remarks: sample moist cured 14 days
Type of Sample: remold
Specific Gravity=2.762 **LL**= **PL**= **PI**=
Test Method: COE uniform strain

Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	125.860		413.600
Moisture content: Dry soil+tare, gms.	112.030		364.200
Moisture content: Tare, gms.	24.930		50.800
Moisture, %	15.9	22.8	15.8
Moist specimen weight, gms.	1217.6		
Diameter, in.	2.84	2.83	
Area, in. ²	6.33	6.28	
Height, in.	6.05	6.02	
Net decrease in height, in.		0.03	
Wet Density, pcf	121.0	129.9	
Dry density, pcf	104.4	105.8	
Void ratio	0.6508	0.6304	
Saturation, %	67.4	100.0	

Test Readings for Specimen No. 1

Primary load ring constant = .463 lbs. per input unit
 Membrane modulus = 0.124105 kN/cm²
 Membrane thickness = 0.02 cm
 Cell pressure = 5.60 psi (0.81 ksf)
 Back pressure = 0.00 psi (0.00 ksf)
 Strain rate, in./min. = 0.05
 Fail. Stress = 4.52 ksf at reading no. 27

MACTEC Engineering and Consulting, Inc.

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.0	0.0	0.0	0.00	0.81	0.81	1.00		0.81
1	0.0010	12.0	5.6	0.0	0.13	0.81	0.93	1.16		0.87
2	0.0050	65.0	30.1	0.1	0.69	0.81	1.50	1.85		1.15
3	0.0100	95.0	44.0	0.2	1.01	0.81	1.81	2.25		1.31
4	0.0150	124.0	57.4	0.2	1.31	0.81	2.12	2.63		1.46
5	0.0200	145.0	67.1	0.3	1.53	0.81	2.34	2.90		1.57
6	0.0250	165.0	76.4	0.4	1.74	0.81	2.55	3.16		1.68
7	0.0300	183.0	84.7	0.5	1.93	0.81	2.74	3.40		1.77
8	0.0350	195.0	90.3	0.6	2.06	0.81	2.86	3.55		1.84
9	0.0400	208.0	96.3	0.7	2.19	0.81	3.00	3.72		1.90
10	0.0450	222.0	102.8	0.7	2.34	0.81	3.14	3.90		1.98
11	0.0500	233.0	107.9	0.8	2.45	0.81	3.26	4.04		2.03
12	0.0750	280.0	129.6	1.2	2.93	0.81	3.74	4.64		2.27
13	0.1000	303.0	140.3	1.7	3.16	0.81	3.97	4.92		2.39
14	0.1250	327.0	151.4	2.1	3.40	0.81	4.20	5.21		2.51
15	0.1500	347.0	160.7	2.5	3.59	0.81	4.40	5.45		2.60
16	0.1750	359.0	166.2	2.9	3.70	0.81	4.51	5.59		2.66
17	0.2000	371.0	171.8	3.3	3.81	0.81	4.61	5.72		2.71
18	0.2500	389.0	180.1	4.1	3.96	0.81	4.76	5.91		2.78
19	0.3000	401.0	185.7	5.0	4.04	0.81	4.85	6.01		2.83
20	0.4000	415.0	192.1	6.6	4.11	0.81	4.92	6.10		2.86
21	0.5000	427.0	197.7	8.3	4.16	0.81	4.96	6.15		2.88
22	0.6000	445.0	206.0	10.0	4.25	0.81	5.06	6.27		2.93
23	0.7000	460.0	213.0	11.6	4.31	0.81	5.12	6.35		2.96
24	0.8000	475.0	219.9	13.3	4.37	0.81	5.18	6.42		2.99
25	0.9000	497.0	230.1	14.9	4.49	0.81	5.29	6.56		3.05
26	1.0000	509.0	235.7	16.6	4.51	0.81	5.31	6.59		3.06
27	1.1000	521.0	241.2	18.3	4.52	0.81	5.33	6.60		3.07

Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	128.130		1393.600
Moisture content: Dry soil+tare, gms.	114.500		1212.300
Moisture content: Tare, gms.	30.350		116.100
Moisture, %	16.2	21.7	16.5
Moist specimen weight, gms.	1276.8		
Diameter, in.	2.84	2.84	
Area, in. ²	6.33	6.32	
Height, in.	6.15	6.14	
Net decrease in height, in.		0.01	
Wet Density, pcf	124.9	131.2	
Dry density, pcf	107.4	107.8	
Void ratio	0.6047	0.6000	
Saturation, %	74.0	100.0	

Test Readings for Specimen No. 2

Primary load ring constant = .463 lbs. per input unit

Membrane modulus = 0.124105 kN/cm²

Membrane thickness = 0.02 cm

Cell pressure = 8.30 psi (1.20 ksf)

Back pressure = 0.00 psi (0.00 ksf)

Strain rate, in./min. = 0.05

Fail. Stress = 6.16 ksf at reading no. 25

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.0	0.0	0.0	0.00	1.20	1.20	1.00		1.20
1	0.0010	33.0	15.3	0.0	0.35	1.20	1.54	1.29		1.37
2	0.0050	77.0	35.7	0.1	0.81	1.20	2.01	1.68		1.60
3	0.0100	127.0	58.8	0.2	1.34	1.20	2.53	2.12		1.86
4	0.0150	164.0	75.9	0.2	1.73	1.20	2.92	2.44		2.06
5	0.0200	193.0	89.4	0.3	2.03	1.20	3.22	2.70		2.21
6	0.0250	220.0	101.9	0.4	2.31	1.20	3.51	2.93		2.35
7	0.0300	242.0	112.0	0.5	2.54	1.20	3.73	3.12		2.46
8	0.0350	262.0	121.3	0.6	2.75	1.20	3.94	3.30		2.57
9	0.0400	287.0	132.9	0.7	3.01	1.20	4.20	3.52		2.70
10	0.0450	298.0	138.0	0.7	3.12	1.20	4.31	3.61		2.75
11	0.0500	310.0	143.5	0.8	3.24	1.20	4.44	3.71		2.82
12	0.0750	380.0	175.9	1.2	3.96	1.20	5.15	4.31		3.17
13	0.1000	426.0	197.2	1.6	4.42	1.20	5.61	4.70		3.40
14	0.1250	460.0	213.0	2.0	4.75	1.20	5.95	4.98		3.57
15	0.1500	497.0	230.1	2.4	5.11	1.20	6.31	5.28		3.75
16	0.2000	534.0	247.2	3.3	5.45	1.20	6.64	5.56		3.92
17	0.2500	558.0	258.4	4.1	5.64	1.20	6.84	5.72		4.02
18	0.3000	575.0	266.2	4.9	5.77	1.20	6.96	5.83		4.08
19	0.4000	592.0	274.1	6.5	5.84	1.20	7.03	5.88		4.11
20	0.5000	619.0	286.6	8.1	6.00	1.20	7.19	6.02		4.19
21	0.6000	631.0	292.2	9.8	6.00	1.20	7.20	6.02		4.20
22	0.7000	653.0	302.3	11.4	6.10	1.20	7.30	6.11		4.25
23	0.8000	667.0	308.8	13.0	6.12	1.20	7.31	6.12		4.25
24	0.9000	681.0	315.3	14.6	6.13	1.20	7.32	6.13		4.26

MACTEC Engineering and Consulting, Inc.

Test Readings for Specimen No. 2

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
25	1.0000	698.0	323.2	16.3	6.16	1.20	7.36	6.16		4.28
26	1.1000	708.0	327.8	17.9	6.13	1.20	7.32	6.13		4.26

Parameters for Specimen No. 3

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	122.870		333.740
Moisture content: Dry soil+tare, gms.	110.280		294.900
Moisture content: Tare, gms.	30.550		52.160
Moisture, %	15.8	21.9	16.0
Moist specimen weight, gms.	1411.4		
Diameter, in.	2.84	2.84	
Area, in. ²	6.33	6.33	
Height, in.	6.83	6.83	
Net decrease in height, in.		0.00	
Wet Density, pcf	124.3	131.0	
Dry density, pcf	107.3	107.5	
Void ratio	0.6066	0.6044	
Saturation, %	71.9	100.0	

Test Readings for Specimen No. 3

Primary load ring constant = .463 lbs. per input unit

Membrane modulus = 0.124105 kN/cm²

Membrane thickness = 0.02 cm

Cell pressure = 13.90 psi (2.00 ksf)

Back pressure = 0.00 psi (0.00 ksf)

Strain rate, in./min. = 0.05

Fail. Stress = 8.58 ksf at reading no. 24

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.0	0.0	0.0	0.00	2.00	2.00	1.00		2.00
1	0.0010	27.0	12.5	0.0	0.28	2.00	2.29	1.14		2.14
2	0.0050	78.0	36.1	0.1	0.82	2.00	2.82	1.41		2.41
3	0.0100	146.0	67.6	0.1	1.54	2.00	3.54	1.77		2.77
4	0.0150	192.0	88.9	0.2	2.02	2.00	4.02	2.01		3.01
5	0.0200	233.0	107.9	0.3	2.45	2.00	4.45	2.22		3.23
6	0.0250	265.0	122.7	0.4	2.78	2.00	4.78	2.39		3.39
7	0.0300	295.0	136.6	0.4	3.09	2.00	5.10	2.55		3.55
8	0.0350	323.0	149.5	0.5	3.39	2.00	5.39	2.69		3.69
9	0.0400	347.0	160.7	0.6	3.63	2.00	5.64	2.82		3.82
10	0.0450	368.0	170.4	0.7	3.85	2.00	5.85	2.92		3.93
11	0.0500	393.0	182.0	0.7	4.11	2.00	6.11	3.05		4.06
12	0.0750	503.0	232.9	1.1	5.24	2.00	7.24	3.62		4.62
13	0.1000	553.0	256.0	1.5	5.74	2.00	7.74	3.87		4.87
14	0.1250	609.0	282.0	1.8	6.30	2.00	8.30	4.15		5.15
15	0.1500	655.0	303.3	2.2	6.75	2.00	8.75	4.37		5.38
16	0.1750	693.0	320.9	2.6	7.11	2.00	9.11	4.55		5.56
17	0.2000	724.0	335.2	2.9	7.40	2.00	9.40	4.70		5.70
18	0.2500	768.0	355.6	3.7	7.79	2.00	9.80	4.89		5.90

MACTEC Engineering and Consulting, Inc.

Test Readings for Specimen No. 3

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
19	0.3000	802.0	371.3	4.4	8.08	2.00	10.08	5.04		6.04
20	0.3500	832.0	385.2	5.1	8.32	2.00	10.32	5.15		6.16
21	0.4000	852.0	394.5	5.9	8.45	2.00	10.45	5.22		6.23
22	0.5000	878.0	406.5	7.3	8.57	2.00	10.57	5.28		6.29
23	0.6000	890.0	412.1	8.8	8.55	2.00	10.55	5.27		6.28
24	0.7000	908.0	420.4	10.3	8.58	2.00	10.59	5.29		6.29
25	0.8000	917.0	424.6	11.7	8.53	2.00	10.53	5.26		6.27
26	0.9000	927.0	429.2	13.2	8.48	2.00	10.48	5.24		6.24
27	1.0000	940.0	435.2	14.6	8.45	2.00	10.45	5.22		6.23
28	1.1000	959.0	444.0	16.1	8.47	2.00	10.48	5.23		6.24

MACTEC Engineering and Consulting, Inc.

tested 7-12-05

cast 6-28-05

Nodarse 6738-05-4576-02

14 day cured specimens

Tube Weight

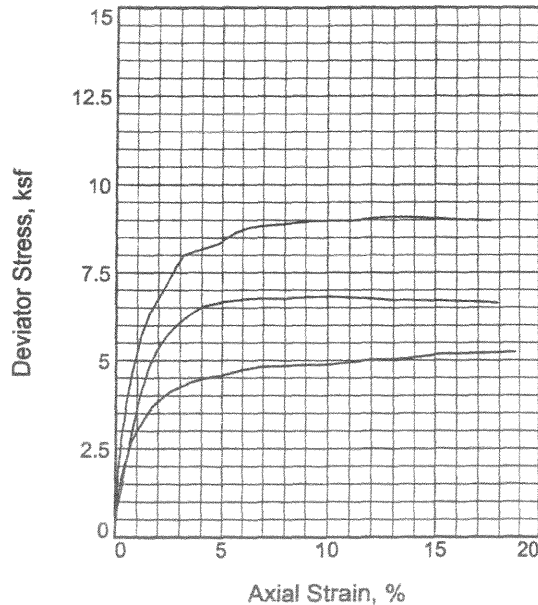
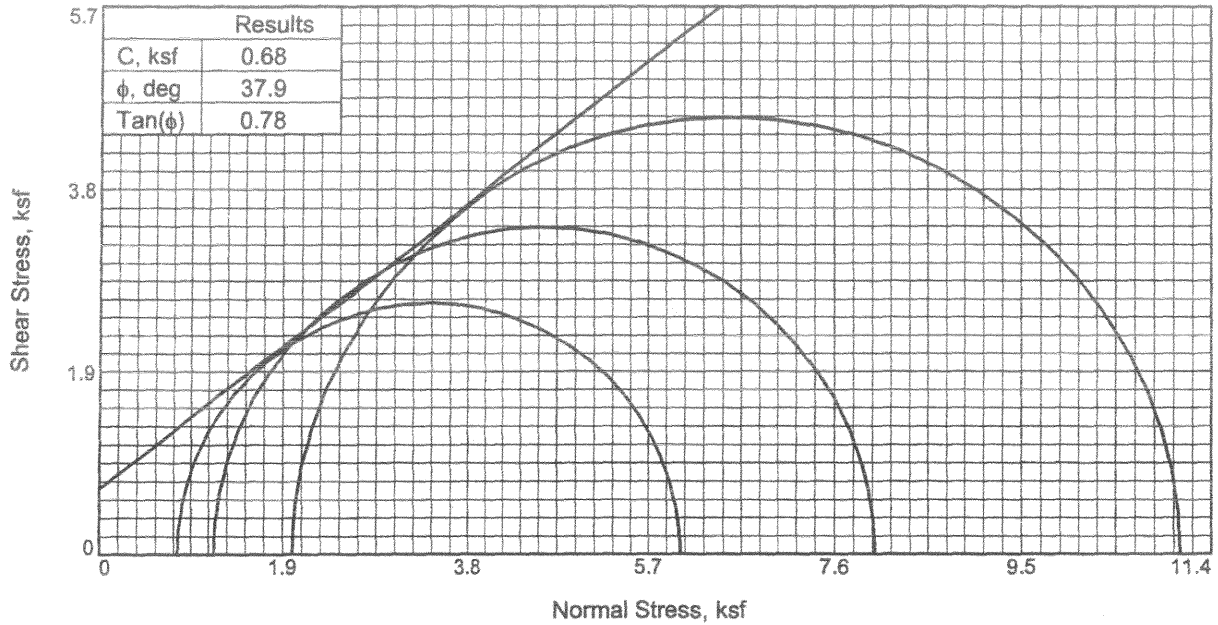
2.84 Area

6.334702 Length

25.2 cm

maximum density
115.5

weight w/ sample and tube	weight sample (lb)	distance to sample (cm)	sample length (in)	sample volume (cuft)	sample wet density (lb/cuft)	wet wt w/ can	dry wt. w/ can	can wt	% moisture	sample dry density (lb/cuft)	% compaction
2104.2	2.95	9.6	6.14	0.0225	131.0	113.5	101.81	30.01	16.28	112.67026	97.6
2147.1	3.04	7.8	6.85	0.0251	121.2	113.5	101.81	30.01	16.28	104.25353	90.3
2152.2	3.12	7	7.17	0.0263	118.8	112.71	100.4	24.56	16.24	102.24443	88.5
2153.5	3.28	6.7	7.28	0.0267	122.8	122.11	109.3	30.67	16.29	105.60068	91.4
1978	2.67	9.8	6.06	0.0222	120.2	122.11	109.3	30.67	16.29	103.35942	89.5
2117.8	2.98	8	6.77	0.0248	120.0	139.18	124.28	32.03	16.15	103.34316	89.5
2173.5	3.10	7.5	6.97	0.0255	121.5	115.81	103.08	25.0	16.31	104.43123	90.4
2128	3.00	8.1	6.73	0.0247	121.6	93.51	84.55	30.01	16.22	104.67476	90.6
2135.8	3.02	8.3	6.65	0.0244	123.8	93.51	84.65	30.01	16.22	106.52016	92.2
1996.8	2.71	10.5	5.79	0.0212	127.9	114.18	102.63	30.35	15.98	110.25697	95.5
2047.8	2.83	9.9	6.02	0.0221	128.0	125.86	112.03	24.93	15.88	110.41974	95.6
2067.3	2.85	9.7	6.10	0.0224	127.2	128.13	114.5	30.35	16.20	109.5015	94.8
2163.9	3.15	8	6.77	0.0248	126.8	122.87	110.28	30.55	15.79	109.50206	94.8
2080	2.90	9.3	6.26	0.0229	126.2	137.56	122.83	31.78	16.18	108.64164	94.1
1989	2.70	10.4	5.83	0.0214	126.2	106.78	98.22	31.52	16.32	108.49796	93.9



Sample No.		1	2	3
Initial	Water Content,	16.0	16.3	16.2
	Dry Density, pcf	108.3	108.0	107.6
	Saturation,	74.5	75.5	74.1
	Void Ratio	0.5925	0.5972	0.6030
	Diameter, in.	2.84	2.84	2.84
	Height, in.	5.87	6.15	6.28
At Test	Water Content,	20.9	21.3	20.9
	Dry Density, pcf	109.4	108.5	109.3
	Saturation,	100.0	100.0	100.0
	Void Ratio	0.5763	0.5886	0.5770
	Diameter, in.	2.83	2.83	2.82
	Height, in.	5.85	6.14	6.25
Strain rate, in./min.		0.05	0.05	0.05
Back Pressure, ksf		0.0	0.0	0.0
Cell Pressure, ksf		0.8	1.2	2.0
Fail. Stress, ksf		5.2	6.8	9.1
Ult. Stress, ksf				
σ_1 Failure, ksf		6.0	8.0	11.1
σ_3 Failure, ksf		0.8	1.2	2.0

Type of Test:

Unconsolidated Undrained

Sample Type: remold**Description:** Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments**Specific Gravity**= 2.762**Remarks:** Samples moist cured 14 days**Client:** Nodarse and Associates**Project:** Material Testing-Nodarse**Sample Number:** UU-95% 14 day cured

Proj. No.: 6738-05-4573

Date: 6-28-05

TRIAxIAL SHEAR TEST REPORT

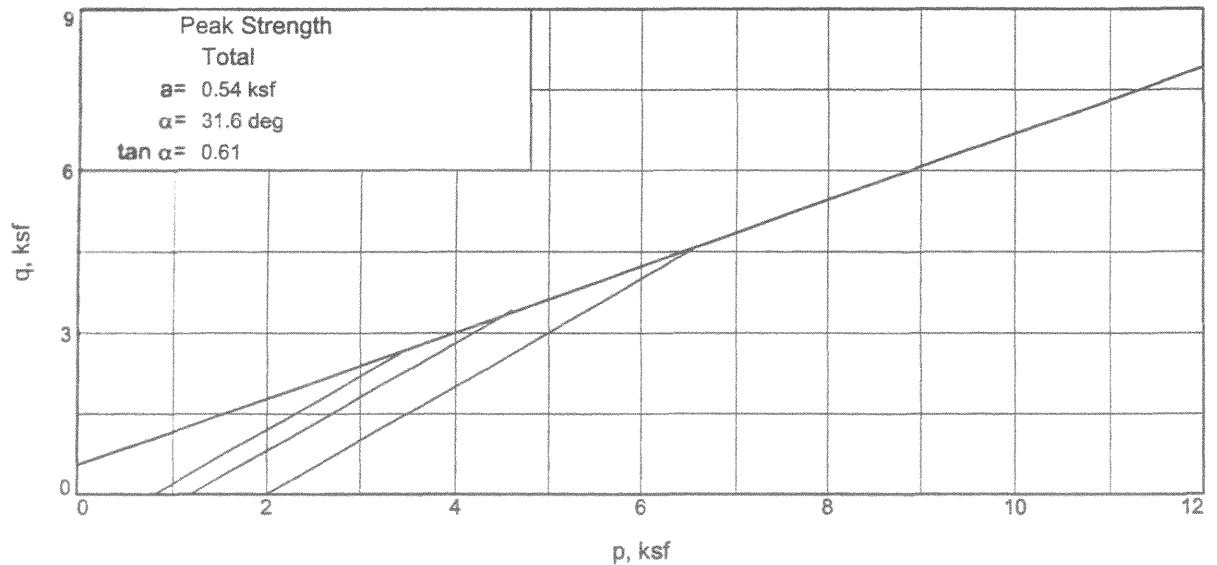
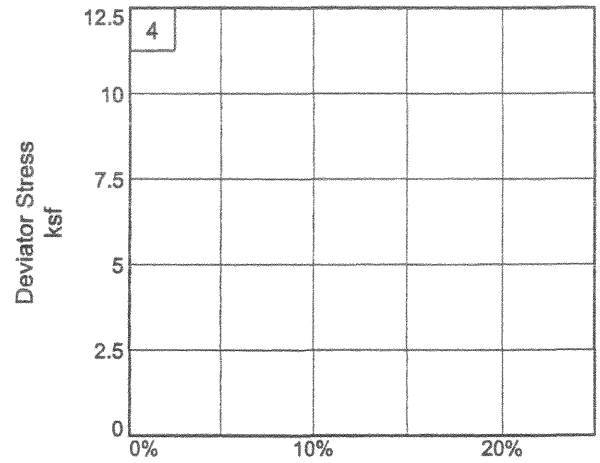
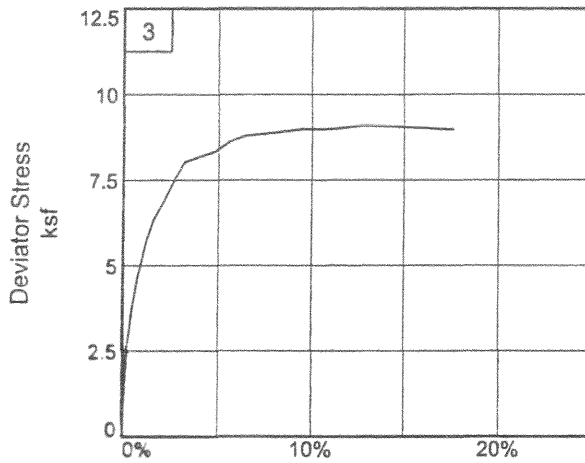
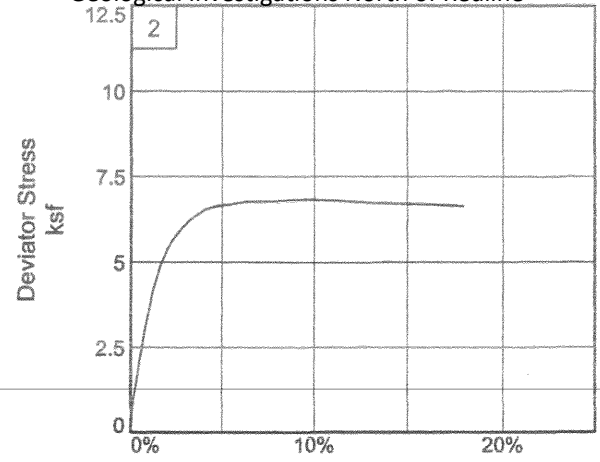
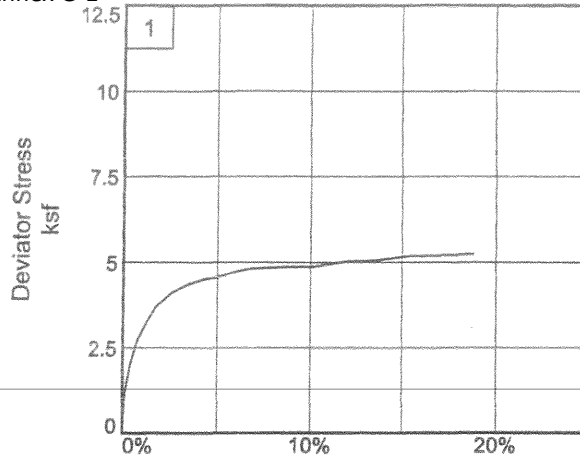
MACTEC ENGINEERING AND CONSULTING, INC.

Reviewed By _____

Tested By: MC

Checked By:

Rajni Sukhwani



Client: Nodarse and Associates

Project: Material Testing-Nodarse

Sample Number: UU-95% 14 day cured

Project No.: 6738-05-4573

Reviewed By _____

MACTEC Engineering and Consulting, Inc.

Tested By: MC _____

Checked By: _____

TRIAXIAL COMPRESSION TEST

Unconsolidated Undrained

7/14/2005

9:03 AM

Date: 6-28-05
Client: Nodarse and Associates
Project: Material Testing-Nodarse
Project No.: 6738-05-4573
Sample Number: UU-95% 14 day cured
Description: Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments
Remarks: Samples moist cured 14 days
Type of Sample: remold
Specific Gravity=2.762 **LL**= **PL**= **PI**=
Test Method: COE uniform strain

Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	114.180		409.300
Moisture content: Dry soil+tare, gms.	102.630		360.550
Moisture content: Tare, gms.	30.350		52.330
Moisture, %	16.0	20.9	15.8
Moist specimen weight, gms.	1225.7		
Diameter, in.	2.84	2.83	
Area, in. ²	6.33	6.29	
Height, in.	5.87	5.85	
Net decrease in height, in.		0.02	
Wet Density, pcf	125.6	132.2	
Dry density, pcf	108.3	109.4	
Void ratio	0.5925	0.5763	
Saturation, %	74.5	100.0	

Test Readings for Specimen No. 1

Primary load ring constant = .463 lbs. per input unit
 Membrane modulus = 0.124105 kN/cm²
 Membrane thickness = 0.02 cm
 Cell pressure = 5.60 psi (0.81 ksf)
 Back pressure = 0.00 psi (0.00 ksf)
 Strain rate, in./min. = 0.05
 Fail. Stress = 5.23 ksf at reading no. 28

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.0	0.0	0.0	0.00	0.81	0.81	1.00		0.81
1	0.0010	31.0	14.4	0.0	0.33	0.81	1.13	1.41		0.97
2	0.0050	78.0	36.1	0.1	0.83	0.81	1.63	2.02		1.22
3	0.0100	121.0	56.0	0.2	1.28	0.81	2.09	2.59		1.45
4	0.0150	148.0	68.5	0.3	1.56	0.81	2.37	2.94		1.59
5	0.0200	172.0	79.6	0.3	1.82	0.81	2.62	3.25		1.71
6	0.0250	193.0	89.4	0.4	2.04	0.81	2.84	3.53		1.82
7	0.0300	210.0	97.2	0.5	2.21	0.81	3.02	3.75		1.91
8	0.0350	227.0	105.1	0.6	2.39	0.81	3.20	3.97		2.00
9	0.0400	243.0	112.5	0.7	2.56	0.81	3.36	4.17		2.09
10	0.0450	256.0	118.5	0.8	2.69	0.81	3.50	4.34		2.15
11	0.0500	268.0	124.1	0.9	2.82	0.81	3.62	4.49		2.21
12	0.0750	312.0	144.5	1.3	3.26	0.81	4.07	5.05		2.44
13	0.1000	352.0	163.0	1.7	3.67	0.81	4.47	5.55		2.64
14	0.1250	374.0	173.2	2.1	3.88	0.81	4.69	5.81		2.75
15	0.1500	397.0	183.8	2.6	4.10	0.81	4.91	6.08		2.86
16	0.1750	410.0	189.8	3.0	4.21	0.81	5.02	6.23		2.91
17	0.2000	425.0	196.8	3.4	4.35	0.81	5.16	6.39		2.98
18	0.2500	443.0	205.1	4.3	4.49	0.81	5.30	6.57		3.05
19	0.3000	455.0	210.7	5.1	4.57	0.81	5.38	6.67		3.09
20	0.3500	473.0	219.0	6.0	4.71	0.81	5.52	6.84		3.16
21	0.4000	486.0	225.0	6.8	4.80	0.81	5.60	6.95		3.21
22	0.5000	500.0	231.5	8.5	4.85	0.81	5.65	7.01		3.23
23	0.6000	512.0	237.1	10.3	4.87	0.81	5.68	7.04		3.24
24	0.7000	537.0	248.6	12.0	5.01	0.81	5.82	7.21		3.31
25	0.8000	552.0	255.6	13.7	5.05	0.81	5.86	7.26		3.33
26	0.9000	577.0	267.2	15.4	5.17	0.81	5.98	7.42		3.39
27	1.0000	591.0	273.6	17.1	5.19	0.81	6.00	7.44		3.40
28	1.1000	608.0	281.5	18.8	5.23	0.81	6.04	7.49		3.42

Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	106.780		858.900
Moisture content: Dry soil+tare, gms.	96.220		771.000
Moisture content: Tare, gms.	31.520		230.300
Moisture, %	16.3	21.3	16.3
Moist specimen weight, gms.	1284.2		
Diameter, in.	2.84	2.83	
Area, in. ²	6.33	6.31	
Height, in.	6.15	6.14	
Net decrease in height, in.		0.01	
Wet Density, pcf	125.6	131.7	
Dry density, pcf	108.0	108.5	
Void ratio	0.5972	0.5886	
Saturation, %	75.5	100.0	

Test Readings for Specimen No. 2

Primary load ring constant = .463 lbs. per input unit

Membrane modulus = 0.124105 kN/cm²

Membrane thickness = 0.02 cm

Cell pressure = 8.30 psi (1.20 ksf)

Back pressure = 0.00 psi (0.00 ksf)

Strain rate, in./min. = 0.05

Fail. Stress = 6.81 ksf at reading no. 23

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.0	0.0	0.0	0.00	1.20	1.20	1.00		1.20
1	0.0010	37.0	17.1	0.0	0.39	1.20	1.59	1.33		1.39
2	0.0050	62.0	28.7	0.1	0.65	1.20	1.85	1.55		1.52
3	0.0100	90.0	41.7	0.2	0.95	1.20	2.14	1.79		1.67
4	0.0150	115.0	53.2	0.2	1.21	1.20	2.41	2.01		1.80
5	0.0200	141.0	65.3	0.3	1.48	1.20	2.68	2.24		1.94
6	0.0250	168.0	77.8	0.4	1.77	1.20	2.96	2.48		2.08
7	0.0300	195.0	90.3	0.5	2.05	1.20	3.24	2.71		2.22
8	0.0350	220.0	101.9	0.6	2.31	1.20	3.51	2.93		2.35
9	0.0400	245.0	113.4	0.7	2.57	1.20	3.77	3.15		2.48
10	0.0450	270.0	125.0	0.7	2.83	1.20	4.03	3.37		2.61
11	0.0500	296.0	137.0	0.8	3.10	1.20	4.30	3.59		2.75
12	0.0750	395.0	182.9	1.2	4.12	1.20	5.32	4.45		3.26
13	0.1000	467.0	216.2	1.6	4.85	1.20	6.05	5.06		3.62
14	0.1250	520.0	240.8	2.0	5.38	1.20	6.58	5.50		3.89
15	0.1500	555.0	257.0	2.4	5.72	1.20	6.91	5.79		4.05
16	0.1750	584.0	270.4	2.9	5.99	1.20	7.19	6.01		4.19
17	0.2000	608.0	281.5	3.3	6.21	1.20	7.41	6.20		4.30
18	0.2500	644.0	298.2	4.1	6.53	1.20	7.72	6.46		4.46
19	0.3000	660.0	305.6	4.9	6.63	1.20	7.83	6.55		4.51
20	0.3500	672.0	311.1	5.7	6.69	1.20	7.89	6.60		4.54
21	0.4000	685.0	317.2	6.5	6.76	1.20	7.96	6.66		4.58
22	0.5000	697.0	322.7	8.1	6.76	1.20	7.96	6.66		4.58
23	0.6000	715.0	331.0	9.8	6.81	1.20	8.01	6.70		4.60
24	0.7000	724.0	335.2	11.4	6.78	1.20	7.97	6.67		4.58

MACTEC Engineering and Consulting, Inc.

Test Readings for Specimen No. 2

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
25	0.8000	731.0	338.5	13.0	6.72	1.20	7.91	6.62		4.55
26	0.9000	743.0	344.0	14.7	6.70	1.20	7.89	6.60		4.54
27	1.0000	755.0	349.6	16.3	6.68	1.20	7.87	6.59		4.53
28	1.1000	764.0	353.7	17.9	6.62	1.20	7.82	6.54		4.51

Parameters for Specimen No. 3

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	137.560		345.130
Moisture content: Dry soil+tare, gms.	122.830		304.400
Moisture content: Tare, gms.	31.780		49.860
Moisture, %	16.2	20.9	16.0
Moist specimen weight, gms.	1305.0		
Diameter, in.	2.84	2.82	
Area, in. ²	6.33	6.27	
Height, in.	6.28	6.25	
Net decrease in height, in.		0.03	
Wet Density, pcf	125.0	132.2	
Dry density, pcf	107.6	109.3	
Void ratio	0.6030	0.5770	
Saturation, %	74.1	100.0	

Test Readings for Specimen No. 3

Primary load ring constant = .463 lbs. per input unit

Membrane modulus = 0.124105 kN/cm²

Membrane thickness = 0.02 cm

Cell pressure = 13.90 psi (2.00 ksf)

Back pressure = 0.00 psi (0.00 ksf)

Strain rate, in./min. = 0.05

Fail. Stress = 9.09 ksf at reading no. 24

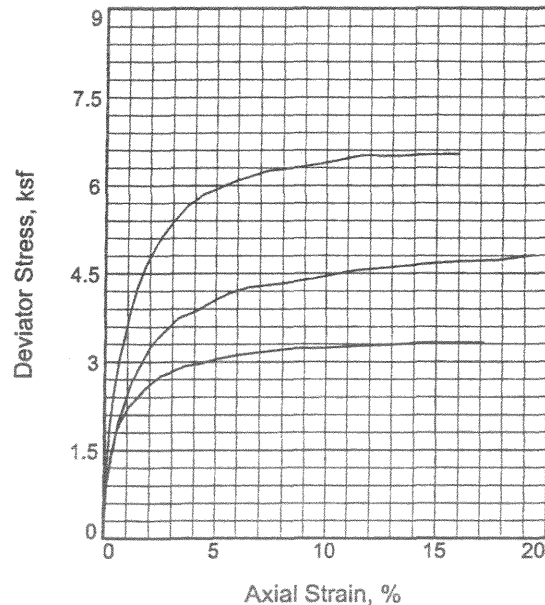
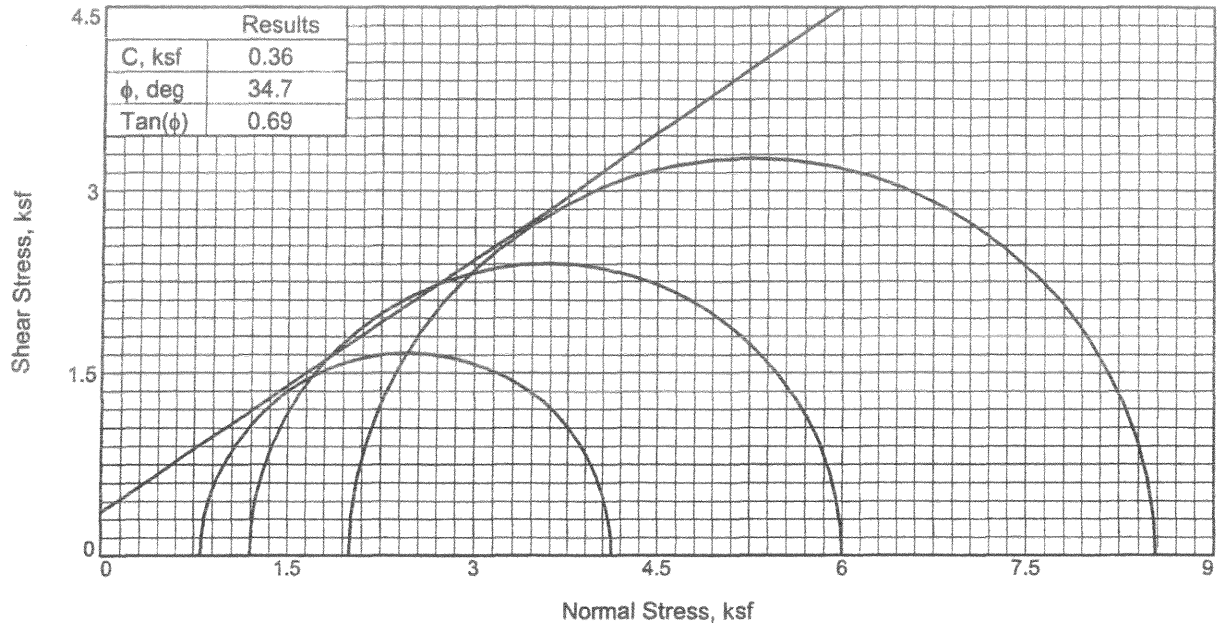
No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.0	0.0	0.0	0.00	2.00	2.00	1.00		2.00
1	0.0010	32.0	14.8	0.0	0.34	2.00	2.34	1.17		2.17
2	0.0050	118.0	54.6	0.1	1.25	2.00	3.26	1.63		2.63
3	0.0100	188.0	87.0	0.2	2.00	2.00	4.00	2.00		3.00
4	0.0150	242.0	112.0	0.2	2.57	2.00	4.57	2.28		3.29
5	0.0200	281.0	130.1	0.3	2.98	2.00	4.98	2.49		3.49
6	0.0250	313.0	144.9	0.4	3.32	2.00	5.32	2.66		3.66
7	0.0300	348.0	161.1	0.5	3.68	2.00	5.69	2.84		3.84
8	0.0350	375.0	173.6	0.6	3.97	2.00	5.97	2.98		3.99
9	0.0400	403.0	186.6	0.6	4.26	2.00	6.26	3.13		4.13
10	0.0450	427.0	197.7	0.7	4.51	2.00	6.51	3.25		4.26
11	0.0500	446.0	206.5	0.8	4.71	2.00	6.71	3.35		4.36
12	0.0750	538.0	249.1	1.2	5.66	2.00	7.66	3.83		4.83
13	0.1000	605.0	280.1	1.6	6.33	2.00	8.34	4.16		5.17
14	0.1250	645.0	298.6	2.0	6.73	2.00	8.73	4.36		5.36
15	0.1500	690.0	319.5	2.4	7.17	2.00	9.17	4.58		5.58
16	0.1750	737.0	341.2	2.8	7.62	2.00	9.62	4.81		5.81

MACTEC Engineering and Consulting, Inc.

Test Readings for Specimen No. 3

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
17	0.2000	777.0	359.8	3.2	8.00	2.00	10.00	5.00		6.00
18	0.3000	821.0	380.1	4.8	8.32	2.00	10.32	5.15		6.16
19	0.3500	858.0	397.3	5.6	8.62	2.00	10.62	5.31		6.31
20	0.4000	882.0	408.4	6.4	8.78	2.00	10.79	5.39		6.39
21	0.5000	907.0	419.9	8.0	8.88	2.00	10.88	5.44		6.44
22	0.6000	934.0	432.4	9.6	8.98	2.00	10.98	5.49		6.49
23	0.7000	951.0	440.3	11.2	8.98	2.00	10.99	5.49		6.49
24	0.8000	980.0	453.7	12.8	9.09	2.00	11.09	5.54		6.55
25	0.9000	995.0	460.7	14.4	9.06	2.00	11.06	5.53		6.53
26	1.0000	1008.0	466.7	16.0	9.01	2.00	11.01	5.50		6.51
27	1.1000	1023.0	473.6	17.6	8.97	2.00	10.97	5.48		6.49

MACTEC Engineering and Consulting, Inc.



Sample No.		1	2	3
Initial	Water Content,	16.2	16.3	16.3
	Dry Density, pcf	103.5	100.7	101.2
	Saturation,	67.4	63.2	63.8
	Void Ratio	0.6653	0.7122	0.7043
	Diameter, in.	2.84	2.84	2.84
	Height, in.	7.04	6.19	6.89
At Test	Water Content,	22.7	25.2	24.9
	Dry Density, pcf	105.9	101.7	102.2
	Saturation,	100.0	100.0	100.0
	Void Ratio	0.6278	0.6957	0.6866
	Diameter, in.	2.82	2.83	2.83
	Height, in.	6.99	6.17	6.87
Strain rate, in./min.		0.05	0.05	0.05
Back Pressure, ksf		0.00	0.00	0.00
Cell Pressure, ksf		0.81	1.20	2.00
Fail. Stress, ksf		3.32	4.80	6.53
Ult. Stress, ksf				
σ_1 Failure, ksf		4.13	6.00	8.53
σ_3 Failure, ksf		0.81	1.20	2.00

Type of Test:

Unconsolidated Undrained

Sample Type: Remolded**Description:** Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments**Specific Gravity**= 2.762**Remarks:** Specimen cured 14 days after molding.**Client:** Nodarse and Associates**Project:** Material Testing-Nodarse**Sample Number:** UU-90% 14 day cured

Proj. No.: 6738-05-4573

Date: 7/12/05

TRIAXIAL SHEAR TEST REPORT

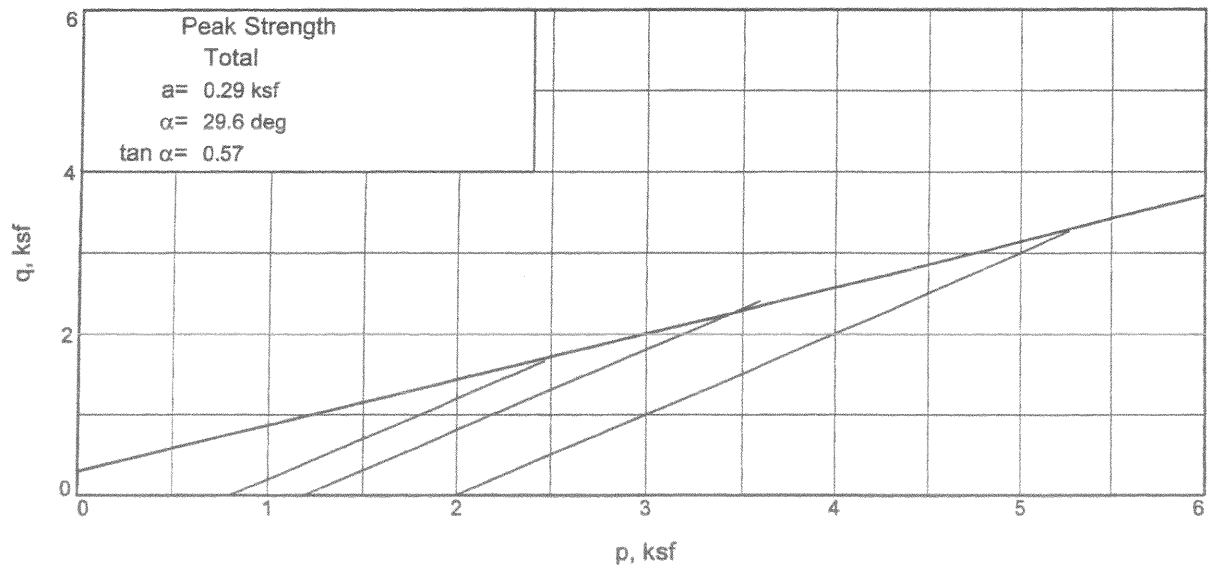
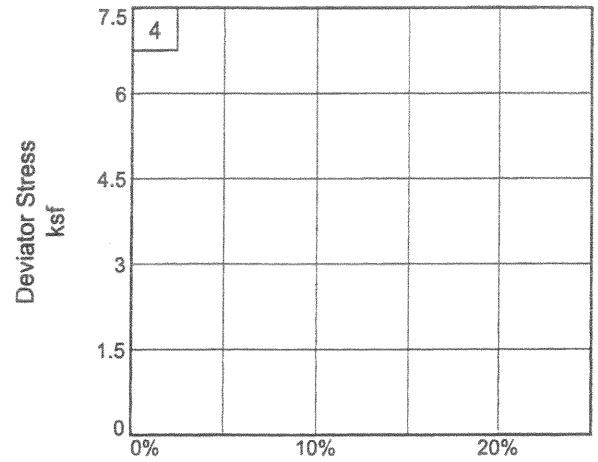
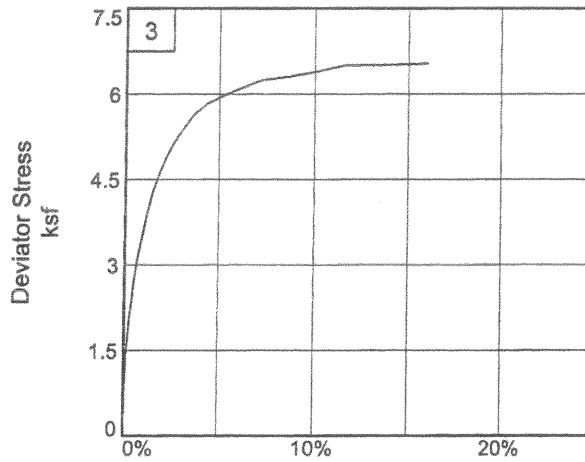
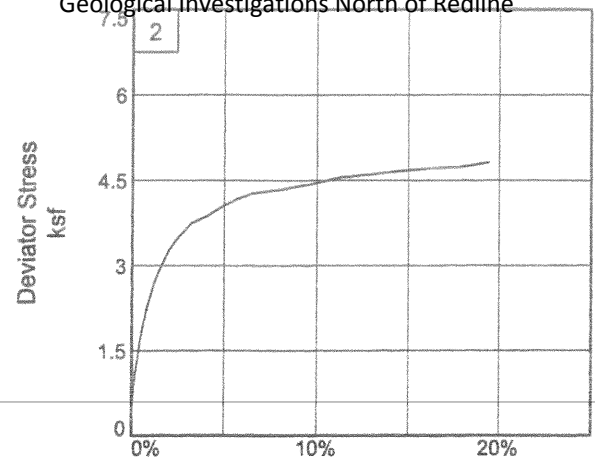
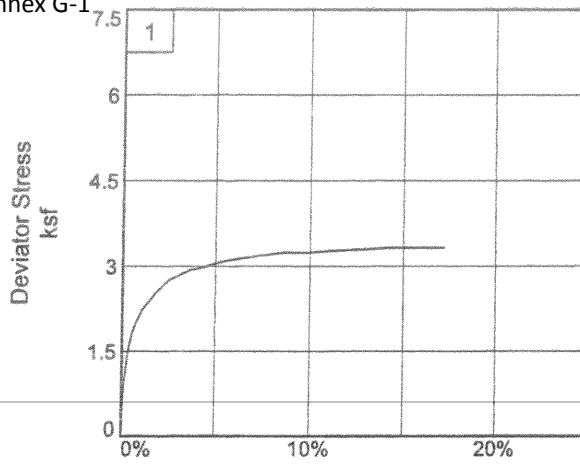
MACTEC ENGINEERING AND CONSULTING, INC.

Reviewed By _____

Tested By: MC _____

Checked By: _____

Lajni Sukhwani



Client: Nodarse and Associates

Project: Material Testing-Nodarse

Sample Number: UU-90% 14 day cured

Project No.: 6738-05-4573

Reviewed By _____

MACTEC Engineering and Consulting, Inc.

Tested By: MC _____

Checked By: _____

TRIAXIAL COMPRESSION TEST

Unconsolidated Undrained

7/14/2005

8:57 AM

Date: 7/12/05
Client: Nodarse and Associates
Project: Material Testing-Nodarse
Project No.: 6738-05-4573
Sample Number: UU-90% 14 day cured
Description: Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments
Remarks: Specimen cured 14 days after molding.
Type of Sample: Remolded
Specific Gravity=2.762 **LL**= **PL**= **PI**=
Test Method: COE uniform strain

Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	112.710		1524.300
Moisture content: Dry soil+tare, gms.	100.400		1328.800
Moisture content: Tare, gms.	24.580		115.390
Moisture, %	16.2	22.7	16.1
Moist specimen weight, gms.	1408.9		
Diameter, in.	2.84	2.82	
Area, in. ²	6.33	6.24	
Height, in.	7.04	6.99	
Net decrease in height, in.		0.05	
Wet Density, pcf	120.4	130.0	
Dry density, pcf	103.5	105.9	
Void ratio	0.6653	0.6278	
Saturation, %	67.4	100.0	

Test Readings for Specimen No. 1

Primary load ring constant = .463 lbs. per input unit
 Membrane modulus = 0.124105 kN/cm²
 Membrane thickness = 0.02 cm
 Cell pressure = 5.60 psi (0.81 ksf)
 Back pressure = 0.00 psi (0.00 ksf)
 Strain rate, in./min. = 0.05
 Fail. Stress = 3.32 ksf at reading no. 28

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.0	0.0	0.0	0.00	0.81	0.81	1.00		0.81
1	0.0010	20.0	9.3	0.0	0.21	0.81	1.02	1.26		0.91
2	0.0050	56.0	25.9	0.1	0.60	0.81	1.40	1.74		1.11
3	0.0100	93.0	43.1	0.1	0.99	0.81	1.80	2.23		1.30
4	0.0150	107.0	49.5	0.2	1.14	0.81	1.95	2.41		1.38
5	0.0200	130.0	60.2	0.3	1.39	0.81	2.19	2.72		1.50
6	0.0250	142.0	65.7	0.4	1.51	0.81	2.32	2.87		1.56
7	0.0300	153.0	70.8	0.4	1.63	0.81	2.43	3.02		1.62
8	0.0350	164.0	75.9	0.5	1.74	0.81	2.55	3.16		1.68
9	0.0400	173.0	80.1	0.6	1.84	0.81	2.64	3.28		1.73
10	0.0450	178.0	82.4	0.6	1.89	0.81	2.70	3.34		1.75
11	0.0500	186.0	86.1	0.7	1.97	0.81	2.78	3.45		1.79
12	0.0750	210.0	97.2	1.1	2.22	0.81	3.03	3.75		1.92
13	0.1000	226.0	104.6	1.4	2.38	0.81	3.19	3.95		2.00
14	0.1250	241.0	111.6	1.8	2.53	0.81	3.34	4.14		2.07
15	0.1500	253.0	117.1	2.1	2.65	0.81	3.45	4.28		2.13
16	0.1750	264.0	122.2	2.5	2.75	0.81	3.56	4.41		2.18
17	0.2000	270.0	125.0	2.9	2.80	0.81	3.61	4.48		2.21
18	0.2500	283.0	131.0	3.6	2.92	0.81	3.72	4.62		2.26
19	0.3000	290.0	134.3	4.3	2.97	0.81	3.77	4.68		2.29
20	0.3500	299.0	138.4	5.0	3.03	0.81	3.84	4.76		2.32
21	0.4000	307.0	142.1	5.7	3.09	0.81	3.90	4.84		2.35
22	0.5000	319.0	147.7	7.2	3.16	0.81	3.97	4.92		2.39
23	0.6000	330.0	152.8	8.6	3.22	0.81	4.03	5.00		2.42
24	0.7000	336.0	155.6	10.0	3.23	0.81	4.04	5.01		2.42
25	0.8000	345.0	159.7	11.4	3.26	0.81	4.07	5.05		2.44
26	0.9000	353.0	163.4	12.9	3.29	0.81	4.09	5.08		2.45
27	1.0000	362.0	167.6	14.3	3.31	0.81	4.12	5.11		2.46
28	1.1000	369.0	170.8	15.7	3.32	0.81	4.13	5.12		2.47
29	1.2000	375.0	173.6	17.2	3.32	0.81	4.13	5.12		2.47

MACTEC Engineering and Consulting, Inc.

Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	122.110		1314.500
Moisture content: Dry soil+tare, gms.	109.300		1148.100
Moisture content: Tare, gms.	30.670		108.500
Moisture, %	16.3	25.2	16.0
Moist specimen weight, gms.	1205.4		
Diameter, in.	2.84	2.83	
Area, in. ²	6.33	6.29	
Height, in.	6.19	6.17	
Net decrease in height, in.		0.02	
Wet Density, pcf	117.1	127.3	
Dry density, pcf	100.7	101.7	
Void ratio	0.7122	0.6957	
Saturation, %	63.2	100.0	

Test Readings for Specimen No. 2

Primary load ring constant = .463 lbs. per input unit

Membrane modulus = 0.124105 kN/cm²

Membrane thickness = 0.02 cm

Cell pressure = 8.30 psi (1.20 ksf)

Back pressure = 0.00 psi (0.00 ksf)

Strain rate, in./min. = 0.05

Fail. Stress = 4.80 ksf at reading no. 29

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.0	0.0	0.0	0.00	1.20	1.20	1.00		1.20
1	0.0010	25.0	11.6	0.0	0.26	1.20	1.46	1.22		1.33
2	0.0050	68.0	31.5	0.1	0.72	1.20	1.91	1.60		1.56
3	0.0100	94.0	43.5	0.2	0.99	1.20	2.19	1.83		1.69
4	0.0150	113.0	52.3	0.2	1.19	1.20	2.39	2.00		1.79
5	0.0200	130.0	60.2	0.3	1.37	1.20	2.57	2.15		1.88
6	0.0250	146.0	67.6	0.4	1.54	1.20	2.74	2.29		1.97
7	0.0300	162.0	75.0	0.5	1.71	1.20	2.90	2.43		2.05
8	0.0350	175.0	81.0	0.6	1.84	1.20	3.04	2.54		2.12
9	0.0400	189.0	87.5	0.6	1.99	1.20	3.18	2.66		2.19
10	0.0450	197.0	91.2	0.7	2.07	1.20	3.27	2.73		2.23
11	0.0500	208.0	96.3	0.8	2.19	1.20	3.38	2.83		2.29
12	0.0750	255.0	118.1	1.2	2.67	1.20	3.86	3.23		2.53
13	0.1000	285.0	132.0	1.6	2.97	1.20	4.17	3.49		2.68
14	0.1250	313.0	144.9	2.0	3.25	1.20	4.44	3.72		2.82
15	0.1500	332.0	153.7	2.4	3.43	1.20	4.63	3.87		2.91
16	0.1750	348.0	161.1	2.8	3.58	1.20	4.78	4.00		2.99
17	0.2000	364.0	168.5	3.2	3.73	1.20	4.93	4.12		3.06
18	0.2500	379.0	175.5	4.1	3.85	1.20	5.05	4.22		3.12
19	0.3000	399.0	184.7	4.9	4.02	1.20	5.22	4.36		3.21
20	0.3500	416.0	192.6	5.7	4.16	1.20	5.35	4.48		3.27
21	0.4000	430.0	199.1	6.5	4.26	1.20	5.46	4.56		3.33
22	0.5000	445.0	206.0	8.1	4.33	1.20	5.53	4.62		3.36
23	0.6000	463.0	214.4	9.7	4.43	1.20	5.62	4.70		3.41
24	0.7000	484.0	224.1	11.3	4.55	1.20	5.74	4.80		3.47

MACTEC Engineering and Consulting, Inc.

Test Readings for Specimen No. 2

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
25	0.8000	499.0	231.0	13.0	4.60	1.20	5.80	4.85		3.50
26	0.9000	515.0	238.4	14.6	4.66	1.20	5.85	4.90		3.53
27	1.0000	530.0	245.4	16.2	4.70	1.20	5.90	4.94		3.55
28	1.1000	542.0	250.9	17.8	4.72	1.20	5.91	4.95		3.55
29	1.2000	563.0	260.7	19.4	4.80	1.20	6.00	5.02		3.60

Parameters for Specimen No. 3

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	113.500		1454.600
Moisture content: Dry soil+tare, gms.	101.810		1264.500
Moisture content: Tare, gms.	30.010		106.100
Moisture, %	16.3	24.9	16.4
Moist specimen weight, gms.	1347.8		
Diameter, in.	2.84	2.83	
Area, in. ²	6.33	6.29	
Height, in.	6.89	6.87	
Net decrease in height, in.		0.02	
Wet Density, pcf	117.6	127.6	
Dry density, pcf	101.2	102.2	
Void ratio	0.7043	0.6866	
Saturation, %	63.8	100.0	

Test Readings for Specimen No. 3

Primary load ring constant = .463 lbs. per input unit

Membrane modulus = 0.124105 kN/cm²

Membrane thickness = 0.02 cm

Cell pressure = 13.90 psi (2.00 ksf)

Back pressure = 0.00 psi (0.00 ksf)

Strain rate, in./min. = 0.05

Fail. Stress = 6.53 ksf at reading no. 28

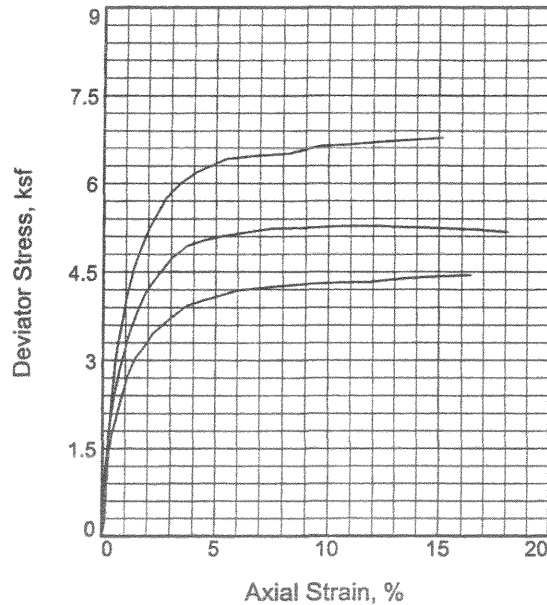
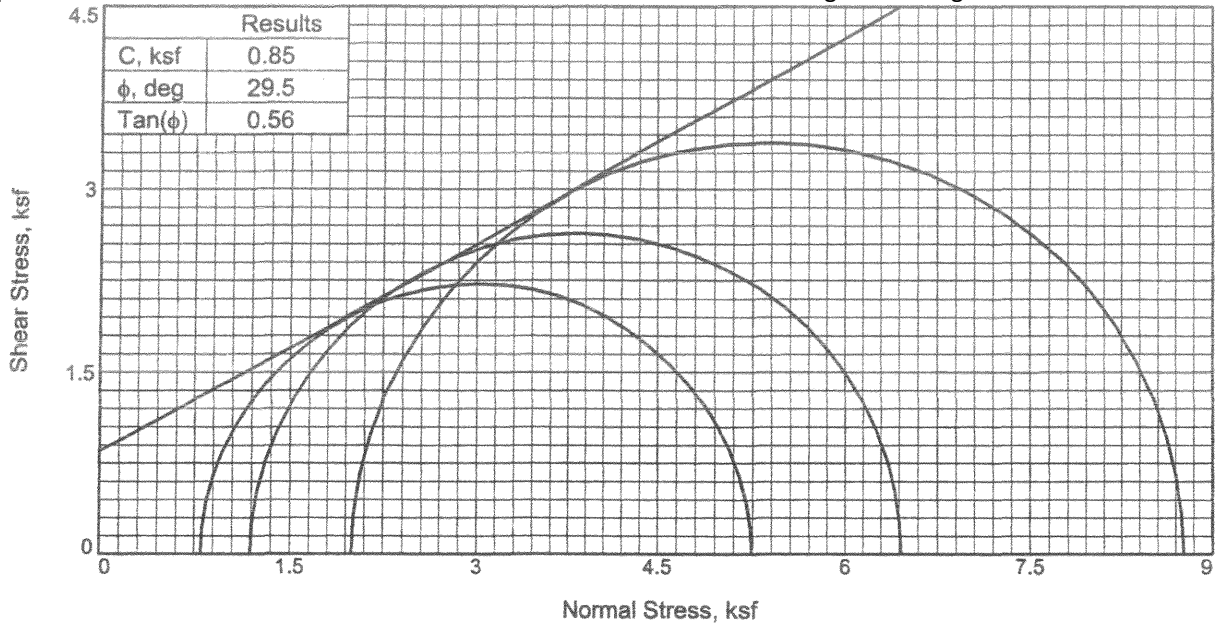
No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.0	0.0	0.0	0.00	2.00	2.00	1.00		2.00
1	0.0010	15.0	6.9	0.0	0.16	2.00	2.16	1.08		2.08
2	0.0050	87.0	40.3	0.1	0.92	2.00	2.92	1.46		2.46
3	0.0100	138.0	63.9	0.1	1.46	2.00	3.46	1.73		2.73
4	0.0150	170.0	78.7	0.2	1.80	2.00	3.80	1.90		2.90
5	0.0200	193.0	89.4	0.3	2.04	2.00	4.04	2.02		3.02
6	0.0250	217.0	100.5	0.4	2.29	2.00	4.29	2.14		3.15
7	0.0300	237.0	109.7	0.4	2.50	2.00	4.50	2.25		3.25
8	0.0350	255.0	118.1	0.5	2.69	2.00	4.69	2.34		3.35
9	0.0400	272.0	125.9	0.6	2.87	2.00	4.87	2.43		3.43
10	0.0450	290.0	134.3	0.7	3.05	2.00	5.06	2.53		3.53
11	0.0500	300.0	138.9	0.7	3.16	2.00	5.16	2.58		3.58
12	0.0750	360.0	166.7	1.1	3.77	2.00	5.78	2.89		3.89
13	0.1000	408.0	188.9	1.5	4.26	2.00	6.26	3.13		4.13
14	0.1250	445.0	206.0	1.8	4.63	2.00	6.63	3.31		4.32
15	0.1500	473.0	219.0	2.2	4.90	2.00	6.91	3.45		4.45

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Test Readings for Specimen No. 5

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
16	0.1750	497.0	230.1	2.5	5.13	2.00	7.13	3.56		4.57
17	0.2000	517.0	239.4	2.9	5.32	2.00	7.32	3.66		4.66
18	0.2500	553.0	256.0	3.6	5.65	2.00	7.65	3.82		4.83
19	0.3000	576.0	266.7	4.4	5.84	2.00	7.84	3.92		4.92
20	0.3500	591.0	273.6	5.1	5.94	2.00	7.95	3.97		4.97
21	0.4000	607.0	281.0	5.8	6.06	2.00	8.06	4.03		5.03
22	0.5000	635.0	294.0	7.3	6.24	2.00	8.24	4.12		5.12
23	0.6000	652.0	301.9	8.7	6.31	2.00	8.31	4.15		5.15
24	0.7000	672.0	311.1	10.2	6.40	2.00	8.40	4.20		5.20
25	0.8000	695.0	321.8	11.7	6.51	2.00	8.51	4.25		5.26
26	0.9000	706.0	326.9	13.1	6.50	2.00	8.50	4.25		5.25
27	1.0000	720.0	333.4	14.6	6.52	2.00	8.52	4.26		5.26
28	1.1000	734.0	339.8	16.0	6.53	2.00	8.53	4.26		5.27

MACTEC Engineering and Consulting, Inc.



Sample No.		1	2	3
Initial	Water Content,	16.2	16.2	16.3
	Dry Density, pcf	105.1	105.8	103.8
	Saturation,	69.7	71.1	68.1
	Void Ratio	0.6400	0.6298	0.6609
	Diameter, in.	2.85	2.84	2.84
	Height, in.	6.72	6.65	7.32
At Test	Water Content,	22.6	22.2	22.4
	Dry Density, pcf	106.1	106.9	106.5
	Saturation,	100.0	100.0	100.0
	Void Ratio	0.6254	0.6136	0.6189
	Diameter, in.	2.84	2.83	2.82
	Height, in.	6.70	6.63	7.26
Strain rate, in./min.		0.05	0.05	0.05
Back Pressure, ksf		0.00	0.00	0.00
Cell Pressure, ksf		0.81	1.20	2.00
Fail. Stress, ksf		4.44	5.27	6.77
Ult. Stress, ksf				
σ_1 Failure, ksf		5.24	6.47	8.77
σ_3 Failure, ksf		0.81	1.20	2.00

Type of Test:

Unconsolidated Undrained

Sample Type: remold**Description:** Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments**Specific Gravity=** 2.762**Remarks:** Specimens cured 14 days**Client:** Nodarse and Associates**Project:** Material Testing-Nodarse**Sample Number:** UU-90%-14 day cured

Proj. No.: 6738-05-4573

Date: 6-28-05

TRIAXIAL SHEAR TEST REPORT

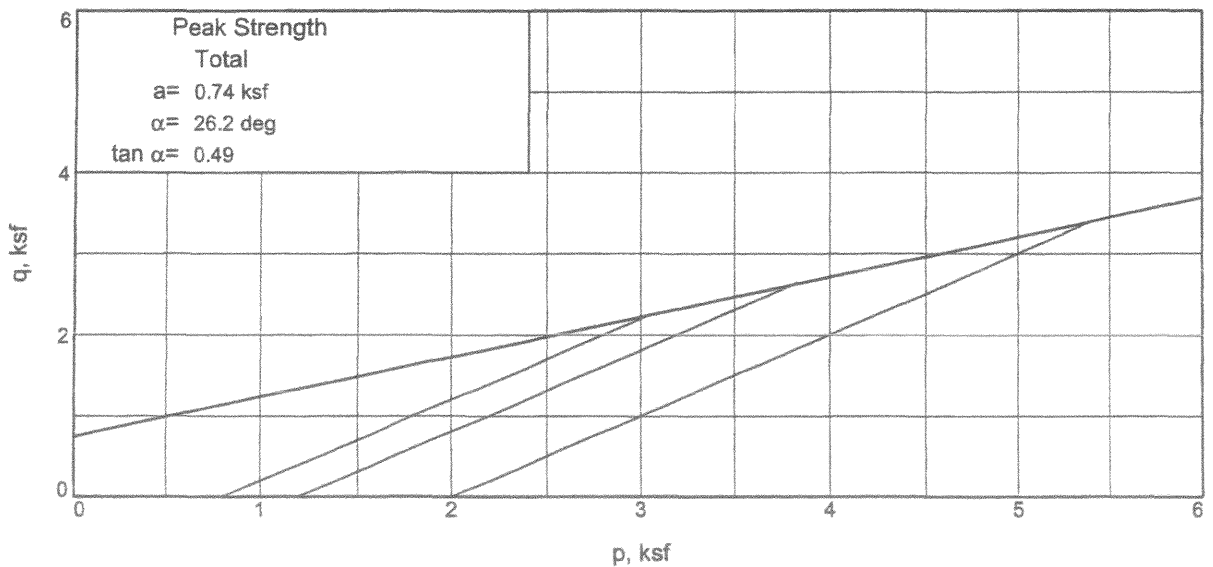
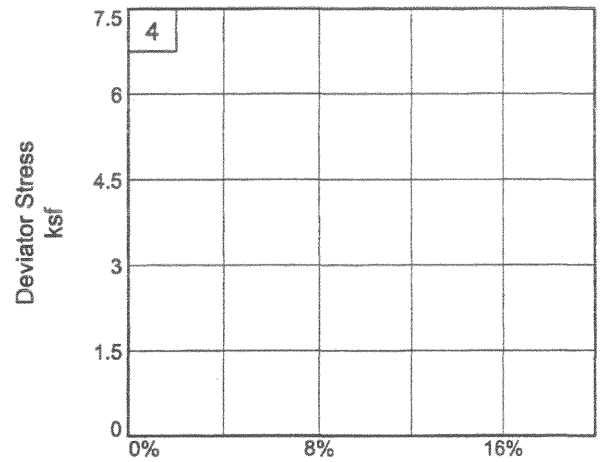
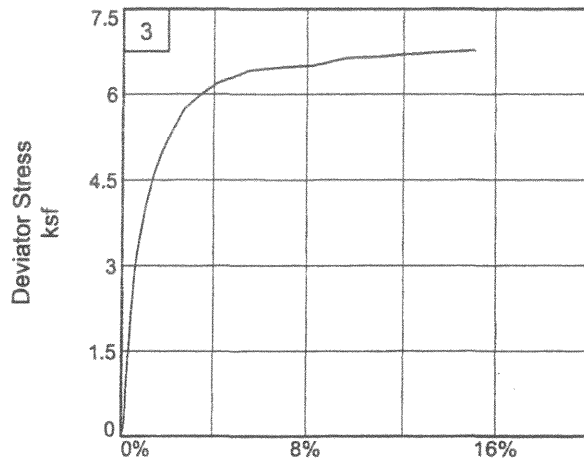
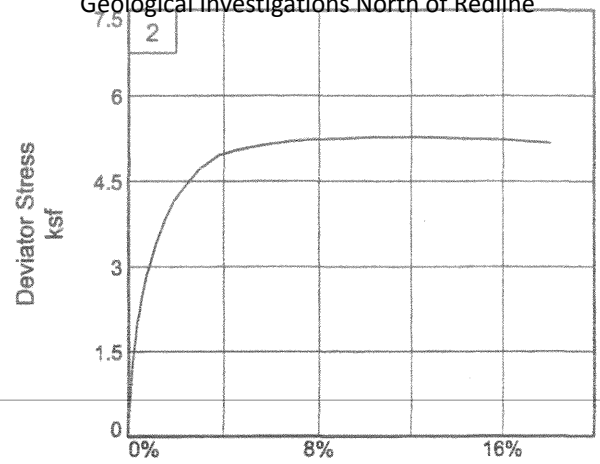
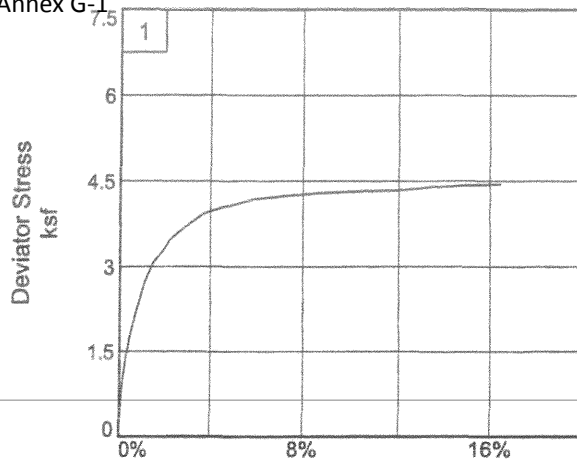
MACTEC ENGINEERING AND CONSULTING, INC.

Reviewed By _____

Tested By: MC

Checked By:

Rajni Sukhwani



Client: Nodarse and Associates
Project: Material Testing-Nodarse
Sample Number: UU-90%-14 day cured
Project No.: 6738-05-4573

Reviewed By _____ **MACTEC Engineering and Consulting, Inc.**

Tested By: MC _____ **Checked By:** _____

TRIAXIAL COMPRESSION TEST

Unconsolidated Undrained

7/14/2005

8:59 AM

Date: 6-28-05
Client: Nodarse and Associates
Project: Material Testing-Nodarse
Project No.: 6738-05-4573
Sample Number: UU-90%-14 day cured
Description: Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments
Remarks: Specimens cured 14 days
Type of Sample: remold
Specific Gravity=2.762 **LL=** **PL=** **PI=**
Test Method: COE uniform strain

Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	139.180		1490.700
Moisture content: Dry soil+tare, gms.	124.280		1300.300
Moisture content: Tare, gms.	32.030		116.290
Moisture, %	16.2	22.6	16.1
Moist specimen weight, gms.	1374.2		
Diameter, in.	2.85	2.84	
Area, in. ²	6.38	6.34	
Height, in.	6.72	6.70	
Net decrease in height, in.		0.02	
Wet Density, pcf	122.1	130.1	
Dry density, pcf	105.1	106.1	
Void ratio	0.6400	0.6254	
Saturation, %	69.7	100.0	

Test Readings for Specimen No. 1

Primary load ring constant = .463 lbs. per input unit

Membrane modulus = 0.124105 kN/cm²

Membrane thickness = 0.02 cm

Cell pressure = 5.60 psi (0.81 ksf)

Back pressure = 0.00 psi (0.00 ksf)

Strain rate, in./min. = 0.05

Fail. Stress = 4.44 ksf at reading no. 27

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.0	0.0	0.0	0.00	0.81	0.81	1.00		0.81
1	0.0010	23.0	10.6	0.0	0.24	0.81	1.05	1.30		0.93
2	0.0050	68.0	31.5	0.1	0.71	0.81	1.52	1.89		1.16
3	0.0100	98.0	45.4	0.1	1.03	0.81	1.84	2.28		1.32
4	0.0150	117.0	54.2	0.2	1.23	0.81	2.03	2.52		1.42
5	0.0200	138.0	63.9	0.3	1.45	0.81	2.25	2.79		1.53
6	0.0250	150.0	69.5	0.4	1.57	0.81	2.38	2.95		1.59
7	0.0300	167.0	77.3	0.4	1.75	0.81	2.55	3.17		1.68
8	0.0350	178.0	82.4	0.5	1.86	0.81	2.67	3.31		1.74
9	0.0400	188.0	87.0	0.6	1.96	0.81	2.77	3.44		1.79
10	0.0450	201.0	93.1	0.7	2.10	0.81	2.91	3.60		1.86
11	0.0500	211.0	97.7	0.7	2.20	0.81	3.01	3.73		1.91
12	0.0750	262.0	121.3	1.1	2.72	0.81	3.53	4.38		2.17
13	0.1000	296.0	137.0	1.5	3.07	0.81	3.87	4.80		2.34
14	0.1250	314.0	145.4	1.9	3.24	0.81	4.05	5.02		2.43
15	0.1500	337.0	156.0	2.2	3.46	0.81	4.27	5.30		2.54
16	0.2000	364.0	168.5	3.0	3.71	0.81	4.52	5.60		2.66
17	0.2500	388.0	179.6	3.7	3.93	0.81	4.73	5.87		2.77
18	0.3000	400.0	185.2	4.5	4.02	0.81	4.82	5.98		2.81
19	0.3500	411.0	190.3	5.2	4.10	0.81	4.90	6.08		2.85
20	0.4000	423.0	195.8	6.0	4.18	0.81	4.99	6.19		2.90
21	0.5000	436.0	201.9	7.5	4.24	0.81	5.05	6.26		2.93
22	0.6000	448.0	207.4	9.0	4.29	0.81	5.09	6.32		2.95
23	0.7000	458.0	212.1	10.4	4.31	0.81	5.12	6.35		2.96
24	0.8000	467.0	216.2	11.9	4.32	0.81	5.13	6.36		2.97
25	0.9000	482.0	223.2	13.4	4.39	0.81	5.19	6.44		3.00
26	1.0000	494.0	228.7	14.9	4.42	0.81	5.22	6.48		3.02
27	1.1000	505.0	233.8	16.4	4.44	0.81	5.24	6.50		3.03

Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	93.510		1475.100
Moisture content: Dry soil+tare, gms.	84.650		1284.200
Moisture content: Tare, gms.	30.010		115.500
Moisture, %	16.2	22.2	16.3
Moist specimen weight, gms.	1359.6		
Diameter, in.	2.84	2.83	
Area, in. ²	6.33	6.29	
Height, in.	6.65	6.63	
Net decrease in height, in.		0.02	
Wet Density, pcf	123.0	130.6	
Dry density, pcf	105.8	106.9	
Void ratio	0.6298	0.6136	
Saturation, %	71.1	100.0	

Test Readings for Specimen No. 2

Primary load ring constant = .463 lbs. per input unit

Membrane modulus = 0.124105 kN/cm²

Membrane thickness = 0.02 cm

Cell pressure = 8.30 psi (1.20 ksf)

Back pressure = 0.00 psi (0.00 ksf)

Strain rate, in./min. = 0.05

Fail. Stress = 5.27 ksf at reading no. 25

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.0	0.0	0.0	0.00	1.20	1.20	1.00		1.20
1	0.0010	20.0	9.3	0.0	0.21	1.20	1.41	1.18		1.30
2	0.0050	63.0	29.2	0.1	0.67	1.20	1.86	1.56		1.53
3	0.0100	110.0	50.9	0.2	1.16	1.20	2.36	1.97		1.78
4	0.0150	141.0	65.3	0.2	1.49	1.20	2.69	2.25		1.94
5	0.0200	166.0	76.9	0.3	1.75	1.20	2.95	2.47		2.07
6	0.0250	190.0	88.0	0.4	2.01	1.20	3.20	2.68		2.20
7	0.0300	205.0	94.9	0.5	2.16	1.20	3.36	2.81		2.28
8	0.0350	223.0	103.2	0.5	2.35	1.20	3.55	2.97		2.37
9	0.0400	239.0	110.7	0.6	2.52	1.20	3.71	3.11		2.45
10	0.0450	254.0	117.6	0.7	2.67	1.20	3.87	3.24		2.53
11	0.0500	268.0	124.1	0.8	2.82	1.20	4.01	3.36		2.60
12	0.0750	322.0	149.1	1.1	3.37	1.20	4.57	3.82		2.88
13	0.1000	365.0	169.0	1.5	3.81	1.20	5.00	4.19		3.10
14	0.1250	398.0	184.3	1.9	4.14	1.20	5.33	4.46		3.26
15	0.1500	420.0	194.5	2.3	4.35	1.20	5.54	4.64		3.37
16	0.1750	440.0	203.7	2.6	4.54	1.20	5.73	4.80		3.46
17	0.2000	460.0	213.0	3.0	4.73	1.20	5.92	4.95		3.56
18	0.2500	485.0	224.6	3.8	4.94	1.20	6.14	5.14		3.67
19	0.3000	498.0	230.6	4.5	5.04	1.20	6.23	5.21		3.71
20	0.3500	508.0	235.2	5.3	5.10	1.20	6.29	5.27		3.74
21	0.4000	517.0	239.4	6.0	5.15	1.20	6.34	5.31		3.77
22	0.5000	534.0	247.2	7.5	5.23	1.20	6.43	5.38		3.81
23	0.6000	544.0	251.9	9.1	5.24	1.20	6.44	5.39		3.82
24	0.7000	556.0	257.4	10.6	5.27	1.20	6.46	5.41		3.83

MACTEC Engineering and Consulting, Inc.

Test Readings for Specimen No. 2

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
25	0.8000	566.0	262.1	12.1	5.27	1.20	6.47	5.41		3.83
26	0.9000	574.0	265.8	13.6	5.26	1.20	6.45	5.40		3.82
27	1.0000	582.0	269.5	15.1	5.24	1.20	6.43	5.38		3.81
28	1.1000	590.0	273.2	16.6	5.21	1.20	6.41	5.36		3.80
29	1.2000	596.0	275.9	18.1	5.17	1.20	6.37	5.33		3.78

Parameters for Specimen No. 3

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	115.810		358.120
Moisture content: Dry soil+tare, gms.	103.080		315.900
Moisture content: Tare, gms.	25.010		54.860
Moisture, %	16.3	22.4	16.2
Moist specimen weight, gms.	1469.7		
Diameter, in.	2.84	2.82	
Area, in. ²	6.33	6.23	
Height, in.	7.32	7.26	
Net decrease in height, in.		0.06	
Wet Density, pcf	120.7	130.4	
Dry density, pcf	103.8	106.5	
Void ratio	0.6609	0.6189	
Saturation, %	68.1	100.0	

Test Readings for Specimen No. 3

Primary load ring constant = .463 lbs. per input unit

Membrane modulus = 0.124105 kN/cm²

Membrane thickness = 0.02 cm

Cell pressure = 13.90 psi (2.00 ksf)

Back pressure = 0.00 psi (0.00 ksf)

Strain rate, in./min. = 0.05

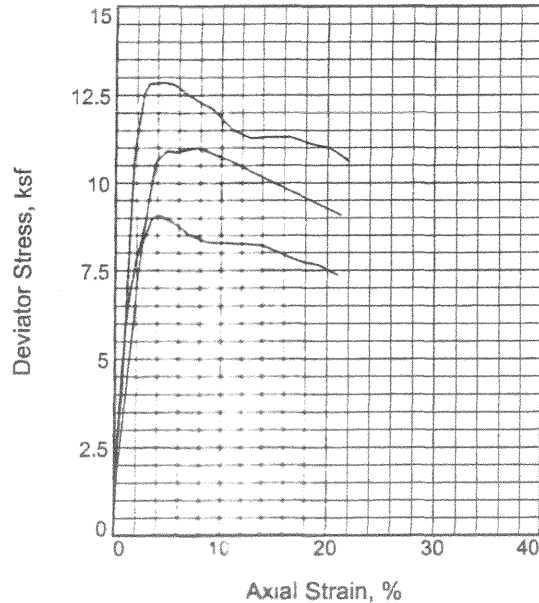
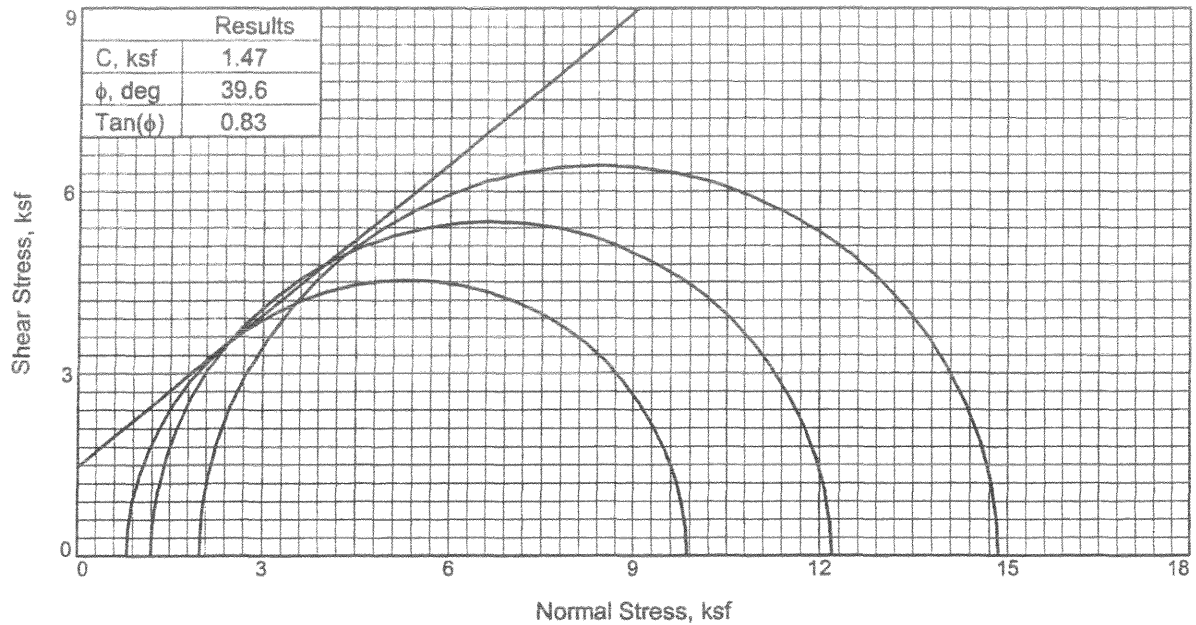
Fail. Stress = 6.77 ksf at reading no. 27

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.0	0.0	0.0	0.00	2.00	2.00	1.00		2.00
1	0.0010	5.0	2.3	0.0	0.05	2.00	2.06	1.03		2.03
2	0.0050	7.0	3.2	0.1	0.07	2.00	2.08	1.04		2.04
3	0.0100	25.0	11.6	0.1	0.27	2.00	2.27	1.13		2.14
4	0.0150	80.0	37.0	0.2	0.85	2.00	2.86	1.43		2.43
5	0.0200	123.0	56.9	0.3	1.31	2.00	3.31	1.66		2.66
6	0.0250	175.0	81.0	0.3	1.87	2.00	3.87	1.93		2.94
7	0.0300	209.0	96.8	0.4	2.23	2.00	4.23	2.11		3.12
8	0.0350	240.0	111.1	0.5	2.56	2.00	4.56	2.28		3.28
9	0.0400	268.0	124.1	0.6	2.85	2.00	4.86	2.43		3.43
10	0.0450	290.0	134.3	0.6	3.09	2.00	5.09	2.54		3.54
11	0.0500	307.0	142.1	0.7	3.26	2.00	5.27	2.63		3.63
12	0.0750	378.0	175.0	1.0	4.01	2.00	6.01	3.00		4.00
13	0.1000	432.0	200.0	1.4	4.56	2.00	6.56	3.28		4.28
14	0.1250	470.0	217.6	1.7	4.95	2.00	6.95	3.47		4.47
15	0.1500	501.0	232.0	2.1	5.25	2.00	7.25	3.62		4.63

MACTEC Engineering and Consulting, Inc.

Test Readings for Specimen No. 3

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
16	0.2000	552.0	255.6	2.8	5.75	2.00	7.75	3.87		4.88
17	0.2500	580.0	268.5	3.4	6.00	2.00	8.00	4.00		5.00
18	0.3000	603.0	279.2	4.1	6.19	2.00	8.19	4.09		5.10
19	0.3500	618.0	286.1	4.8	6.30	2.00	8.30	4.15		5.15
20	0.4000	634.0	293.5	5.5	6.41	2.00	8.42	4.20		5.21
21	0.5000	649.0	300.5	6.9	6.47	2.00	8.47	4.23		5.24
22	0.6000	662.0	306.5	8.3	6.50	2.00	8.50	4.25		5.25
23	0.7000	686.0	317.6	9.6	6.64	2.00	8.64	4.32		5.32
24	0.8000	699.0	323.6	11.0	6.66	2.00	8.66	4.33		5.33
25	0.9000	715.0	331.0	12.4	6.71	2.00	8.71	4.35		5.35
26	1.0000	730.0	338.0	13.8	6.74	2.00	8.74	4.37		5.37
27	1.1000	745.0	344.9	15.2	6.77	2.00	8.77	4.38		5.39



Sample No.		1	2	3
Initial	Water Content,	15.3	15.3	15.4
	Dry Density, pcf	109.5	109.0	108.9
	Saturation,	73.5	72.7	72.9
	Void Ratio	0.5754	0.5818	0.5835
	Diameter, in.	2.84	2.84	2.84
	Height, in.	5.73	5.23	5.47
At Test	Water Content,	20.4	19.3	20.3
	Dry Density, pcf	110.4	112.5	110.5
	Saturation,	100.0	100.0	100.0
	Void Ratio	0.5622	0.5331	0.5601
	Diameter, in.	2.83	2.81	2.83
	Height, in.	5.71	5.18	5.44
Strain rate, in./min.		0.05	0.05	0.05
Back Pressure, ksf		0.0	0.0	0.0
Cell Pressure, ksf		0.8	1.2	2.0
Fail. Stress, ksf		9.1	11.0	12.8
Ult. Stress, ksf				
σ_1 Failure, ksf		9.9	12.2	14.8
σ_3 Failure, ksf		0.8	1.2	2.0

Type of Test:

Unconsolidated Undrained

Sample Type: remold**Description:** Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments**Specific Gravity=** 2.762**Remarks:****Reviewed By** _____**Client:** Nodarse and Associates**Project:** Material Testing-Nodarse**Sample Number:** UU-95%-B

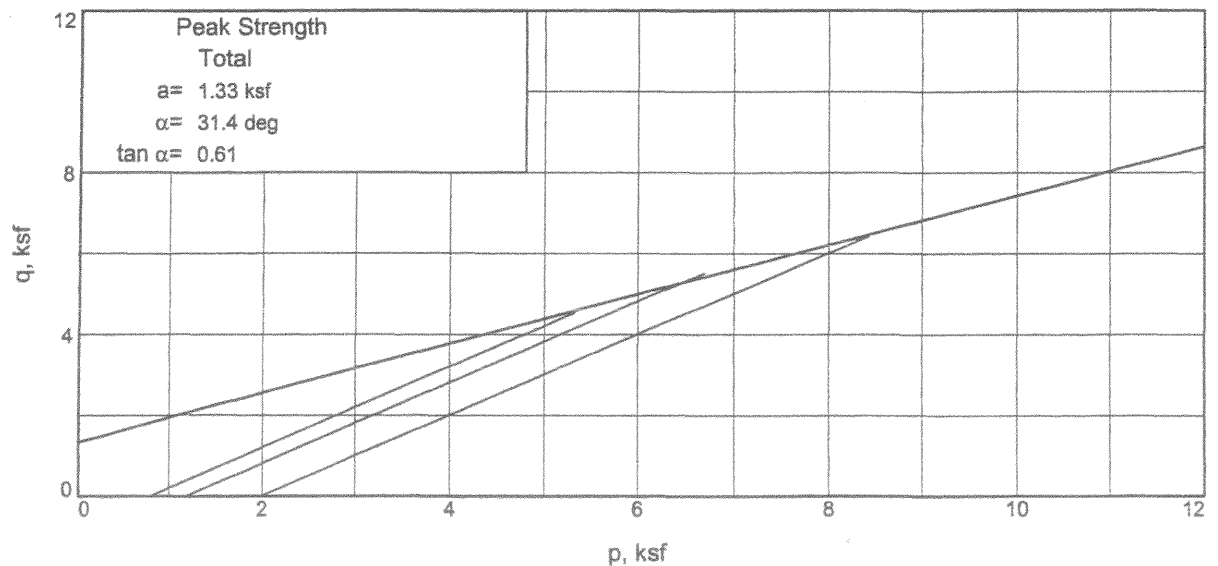
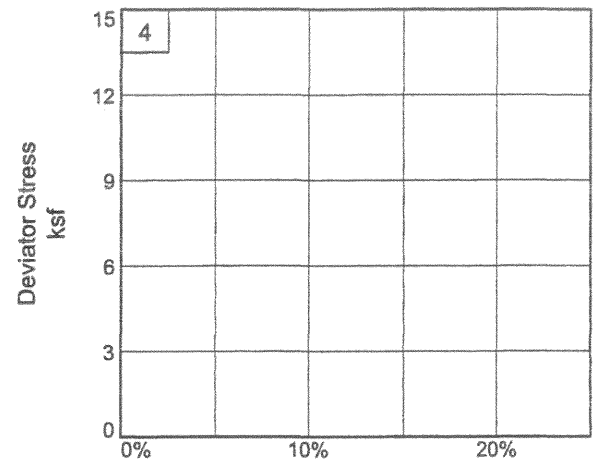
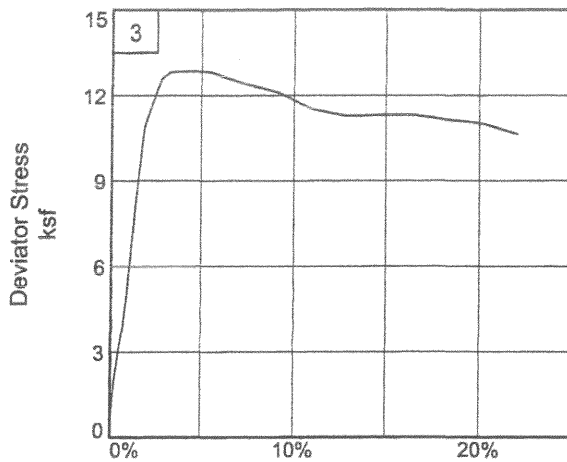
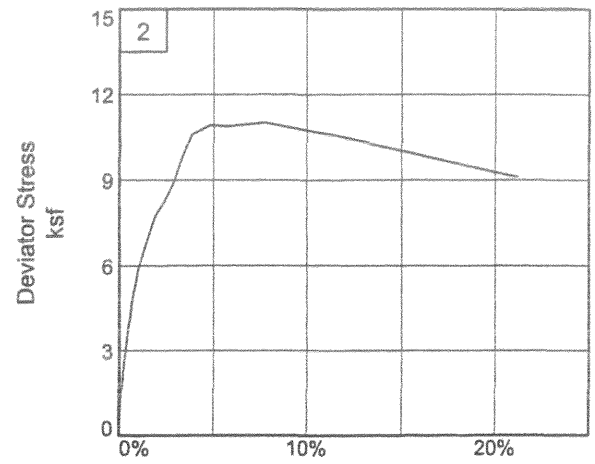
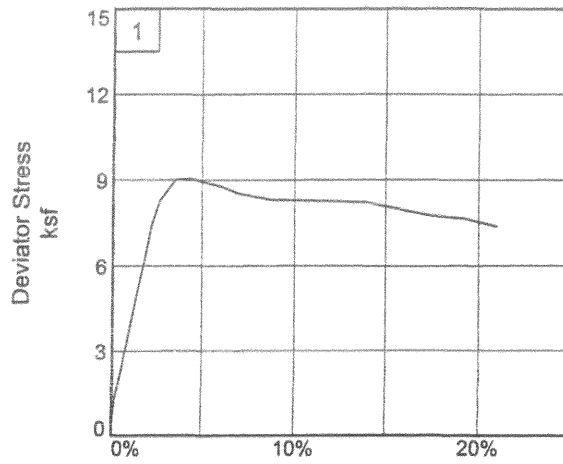
Proj. No.: 6738-05-4573

Date: 6-11-05

TRIAXIAL SHEAR TEST REPORT

MACTEC ENGINEERING AND CONSULTING, INC.

Tested By: mc**Checked By:** *Rajni Sukhwani*



Client: Nodarse and Associates
 Project: Material Testing-Nodarse
 Sample Number: UU-95%-B
 Project No.: 6738-05-4573

Reviewed By _____ MACTEC Engineering and Consulting, Inc.

Tested By: mc _____ Checked By: _____

TRIAxIAL COMPRESSION TEST

Unconsolidated Undrained

6/15/2005

10:46 AM

Date: 6-11-05
Client: Nodarse and Associates
Project: Material Testing-Nodarse
Project No.: 6738-05-4573
Sample Number: UU-95%-B
Description: Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments
Remarks:
Type of Sample: remold
Specific Gravity: 2.762 **LL=** **PL=** **PI=**
Test Method: COE uniform strain

Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	188.130		1340.400
Moisture content: Dry soil+tare, gms.	170.070		1175.600
Moisture content: Tare, gms.	52.090		116.300
Moisture, %	15.3	20.4	15.6
Moist specimen weight, gms.	1202.5		
Diameter, in.	2.84	2.83	
Area, in. ²	6.33	6.30	
Height, in.	5.73	5.71	
Net decrease in height, in.		0.02	
Wet Density, pcf	126.2	132.8	
Dry density, pcf	109.5	110.4	
Void ratio	0.5754	0.5622	
Saturation, %	73.5	100.0	

Test Readings for Specimen No. 1

Load ring constant = 3.313 lbs. per input unit
 Membrane modulus = 0.124105 kN/cm²
 Membrane thickness = 0.02 cm
 Cell pressure = 5.60 psi (0.81 ksf)
 Back pressure = 0.00 psi (0.00 ksf)
 Strain rate, in./min. = 0.05
 Fail. Stress = 9.05 ksf at reading no. 17

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	0.81	0.81	1.00		0.81
1	0.0010	5.00	16.6	0.0	0.38	0.81	1.19	1.47		1.00
2	0.0050	12.00	39.8	0.1	0.91	0.81	1.71	2.13		1.26
3	0.0100	18.00	59.6	0.2	1.36	0.81	2.17	2.69		1.49
4	0.0150	22.00	72.9	0.3	1.66	0.81	2.47	3.06		1.64
5	0.0200	26.00	86.1	0.4	1.96	0.81	2.77	3.43		1.79
6	0.0250	29.00	96.1	0.4	2.19	0.81	2.99	3.71		1.90
7	0.0300	32.00	106.0	0.5	2.41	0.81	3.22	3.99		2.01
8	0.0350	36.00	119.3	0.6	2.71	0.81	3.52	4.36		2.16
9	0.0400	40.00	132.5	0.7	3.01	0.81	3.81	4.73		2.31
10	0.0450	43.00	142.5	0.8	3.23	0.81	4.04	5.01		2.42
11	0.0500	47.00	155.7	0.9	3.53	0.81	4.33	5.38		2.57
12	0.0750	65.00	215.3	1.3	4.86	0.81	5.66	7.02		3.24
13	0.1000	81.00	268.4	1.8	6.03	0.81	6.83	8.47		3.82
14	0.1250	100.00	331.3	2.2	7.41	0.81	8.21	10.19		4.51
15	0.1500	112.00	371.1	2.6	8.26	0.81	9.07	11.24		4.94
16	0.2000	123.00	407.5	3.5	8.99	0.81	9.80	12.15		5.30
17	0.2500	125.00	414.1	4.4	9.05	0.81	9.86	12.23		5.33
18	0.3000	124.00	410.8	5.3	8.90	0.81	9.70	12.03		5.26
19	0.3500	123.00	407.5	6.1	8.74	0.81	9.55	11.84		5.18
20	0.4000	121.00	400.9	7.0	8.52	0.81	9.33	11.57		5.07
21	0.5000	120.00	397.6	8.8	8.29	0.81	9.10	11.28		4.95
22	0.6000	122.00	404.2	10.5	8.27	0.81	9.08	11.25		4.94
23	0.7000	124.00	410.8	12.3	8.24	0.81	9.05	11.22		4.93
24	0.8000	126.00	417.4	14.0	8.21	0.81	9.01	11.18		4.91
25	0.9000	125.00	414.1	15.8	7.98	0.81	8.78	10.89		4.79
26	1.0000	124.00	410.8	17.5	7.75	0.81	8.55	10.61		4.68
27	1.1000	125.00	414.1	19.3	7.64	0.81	8.45	10.48		4.63
28	1.2000	123.00	407.5	21.0	7.36	0.81	8.17	10.13		4.49

Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	188.130		1199.200
Moisture content: Dry soil+tare, gms.	170.070		1052.600
Moisture content: Tare, gms.	52.090		115.000
Moisture, %	15.3	19.3	15.6
Moist specimen weight, gms.	1093.1		
Diameter, in.	2.84	2.81	
Area, in. ²	6.33	6.20	
Height, in.	5.23	5.18	
Net decrease in height, in.		0.05	
Wet Density, pcf	125.7	134.2	
Dry density, pcf	109.0	112.5	
Void ratio	0.5818	0.5331	
Saturation, %	72.7	100.0	

Test Readings for Specimen No. 2

Load ring constant = 3.313 lbs. per input unit

Membrane modulus = 0.124105 kN/cm²

Membrane thickness = 0.02 cm

Cell pressure = 8.30 psi (1.20 ksf)

Back pressure = 0.00 psi (0.00 ksf)

Strain rate, in./min. = 0.05

Fail. Stress = 11.00 ksf at reading no. 20

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	1.20	1.20	1.00		1.20
1	0.0010	5.00	16.6	0.0	0.38	1.20	1.58	1.32		1.39
2	0.0050	16.00	53.0	0.1	1.23	1.20	2.42	2.03		1.81
3	0.0100	26.00	86.1	0.2	2.00	1.20	3.19	2.67		2.19
4	0.0150	35.00	116.0	0.3	2.68	1.20	3.88	3.25		2.54
5	0.0200	41.00	135.8	0.4	3.14	1.20	4.34	3.63		2.77
6	0.0250	49.00	162.3	0.5	3.75	1.20	4.95	4.14		3.07
7	0.0300	54.00	178.9	0.6	4.13	1.20	5.32	4.45		3.26
8	0.0350	61.00	202.1	0.7	4.66	1.20	5.85	4.90		3.52
9	0.0400	66.00	218.7	0.8	5.04	1.20	6.23	5.21		3.71
10	0.0450	70.00	231.9	0.9	5.34	1.20	6.53	5.46		3.86
11	0.0500	76.00	251.8	1.0	5.79	1.20	6.98	5.84		4.09
12	0.0750	90.00	298.2	1.4	6.82	1.20	8.02	6.71		4.61
13	0.1000	103.00	341.2	1.9	7.77	1.20	8.96	7.50		5.08
14	0.1250	110.00	364.4	2.4	8.25	1.20	9.45	7.91		5.32
15	0.1500	119.00	394.2	2.9	8.89	1.20	10.08	8.43		5.64
16	0.1750	132.00	437.3	3.4	9.81	1.20	11.00	9.21		6.10
17	0.2000	143.00	473.8	3.9	10.57	1.20	11.77	9.85		6.48
18	0.2500	149.00	493.6	4.8	10.90	1.20	12.10	10.12		6.65
19	0.3000	150.00	497.0	5.8	10.87	1.20	12.06	10.09		6.63
20	0.4000	155.00	513.5	7.7	11.00	1.20	12.19	10.20		6.69
21	0.5000	155.00	513.5	9.7	10.77	1.20	11.96	10.01		6.58
22	0.6000	155.00	513.5	11.6	10.54	1.20	11.73	9.82		6.46
23	0.7000	154.00	510.2	13.5	10.24	1.20	11.44	9.57		6.32
24	0.8000	153.00	506.9	15.5	9.95	1.20	11.14	9.32		6.17

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Test Readings for Specimen No. 2

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
25	0.9000	152.00	503.6	17.4	9.66	1.20	10.85	9.08		6.02
26	1.0000	151.00	500.3	19.3	9.37	1.20	10.56	8.84		5.88
27	1.1000	150.00	497.0	21.3	9.08	1.20	10.28	8.60		5.74

Parameters for Specimen No. 3

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	189.370		1256.200
Moisture content: Dry soil+tare, gms.	171.030		1099.800
Moisture content: Tare, gms.	51.890		98.400
Moisture, %	15.4	20.3	15.6
Moist specimen weight, gms.	1142.9		
Diameter, in.	2.84	2.83	
Area, in. ²	6.33	6.27	
Height, in.	5.47	5.44	
Net decrease in height, in.		0.03	
Wet Density, pcf	125.7	132.9	
Dry density, pcf	108.9	110.5	
Void ratio	0.5835	0.5601	
Saturation, %	72.9	100.0	

Test Readings for Specimen No. 3

Load ring constant = 3.313 lbs. per input unit

Membrane modulus = 0.124105 kN/cm²

Membrane thickness = 0.02 cm

Cell pressure = 13.90 psi (2.00 ksf)

Back pressure = 0.00 psi (0.00 ksf)

Strain rate, in./min. = 0.05

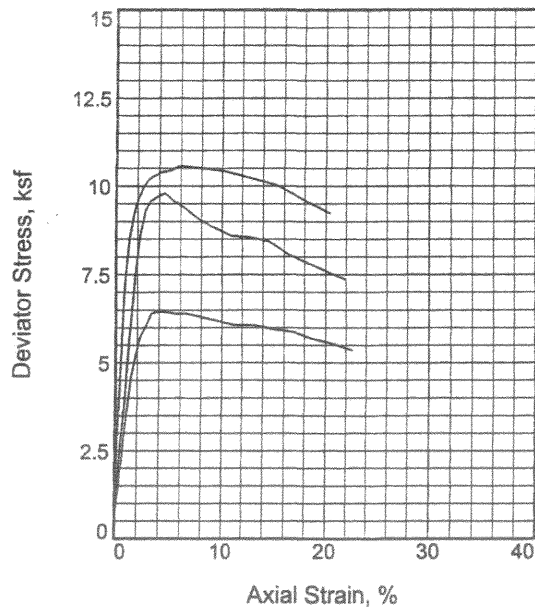
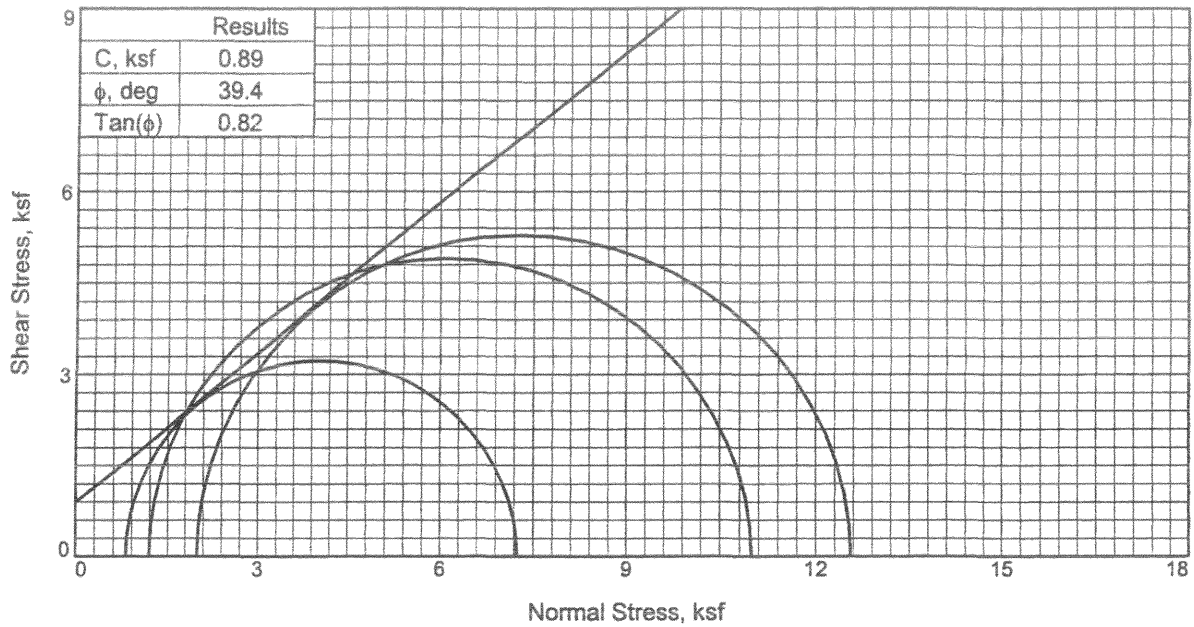
Fail. Stress = 12.84 ksf at reading no. 17

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	2.00	2.00	1.00		2.00
1	0.0010	6.00	19.9	0.0	0.46	2.00	2.46	1.23		2.23
2	0.0050	17.00	56.3	0.1	1.29	2.00	3.29	1.65		2.65
3	0.0100	24.00	79.5	0.2	1.82	2.00	3.82	1.91		2.91
4	0.0150	30.00	99.4	0.3	2.28	2.00	4.28	2.14		3.14
5	0.0200	36.00	119.3	0.4	2.73	2.00	4.73	2.36		3.37
6	0.0250	41.00	135.8	0.5	3.10	2.00	5.11	2.55		3.55
7	0.0300	46.00	152.4	0.6	3.48	2.00	5.48	2.74		3.74
8	0.0350	51.00	169.0	0.6	3.85	2.00	5.86	2.93		3.93
9	0.0400	57.00	188.8	0.7	4.30	2.00	6.31	3.15		4.15
10	0.0450	64.00	212.0	0.8	4.83	2.00	6.83	3.41		4.42
11	0.0500	72.00	238.5	0.9	5.43	2.00	7.43	3.71		4.71
12	0.0750	112.00	371.1	1.4	8.40	2.00	10.40	5.20		6.20
13	0.1000	146.00	483.7	1.8	10.90	2.00	12.90	6.45		7.45
14	0.1500	170.00	563.2	2.8	12.57	2.00	14.58	7.28		8.29
15	0.1750	174.00	576.5	3.2	12.81	2.00	14.81	7.40		8.41
16	0.2000	175.00	579.8	3.7	12.82	2.00	14.82	7.41		8.41
17	0.2500	177.00	586.4	4.6	12.84	2.00	14.85	7.42		8.42

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Test Readings for Specimen No. 3

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
18	0.3000	178.00	589.7	5.5	12.79	2.00	14.79	7.39		8.40
19	0.3500	177.00	586.4	6.4	12.60	2.00	14.60	7.29		8.30
20	0.4000	176.00	583.1	7.3	12.40	2.00	14.40	7.20		8.20
21	0.5000	175.00	579.8	9.2	12.09	2.00	14.09	7.04		8.05
22	0.6000	170.00	563.2	11.0	11.51	2.00	13.51	6.75		7.75
23	0.7000	170.00	563.2	12.9	11.27	2.00	13.27	6.63		7.64
24	0.8000	174.00	576.5	14.7	11.29	2.00	13.29	6.64		7.65
25	0.9000	178.00	589.7	16.5	11.30	2.00	13.30	6.65		7.65
26	1.0000	179.00	593.0	18.4	11.11	2.00	13.12	6.55		7.56
27	1.1000	181.00	599.7	20.2	10.98	2.00	12.99	6.49		7.49
28	1.2000	179.00	593.0	22.0	10.61	2.00	12.61	6.30		7.31



Sample No.		1	2	3
Initial	Water Content,	16.6	16.1	16.8
	Dry Density, pcf	104.1	103.5	104.6
	Saturation,	70.0	66.7	71.5
	Void Ratio	0.6567	0.6651	0.6486
	Diameter, in.	2.84	2.84	2.84
	Height, in.	5.32	5.50	5.90
At Test	Water Content,	22.9	23.3	22.8
	Dry Density, pcf	105.6	105.0	105.7
	Saturation,	100.0	100.0	100.0
	Void Ratio	0.6334	0.6425	0.6310
	Diameter, in.	2.83	2.83	2.83
	Height, in.	5.29	5.47	5.88
Strain rate, in./min.		0.05	0.05	0.05
Back Pressure, ksf		0.0	0.0	0.0
Cell Pressure, ksf		0.8	1.2	2.0
Fail. Stress, ksf		6.4	9.8	10.6
Ult. Stress, ksf				
σ_1 Failure, ksf		7.3	11.0	12.6
σ_3 Failure, ksf		0.8	1.2	2.0

Type of Test:

Unconsolidated Undrained

Sample Type: remolded**Description:** Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments**Specific Gravity**= 2.762**Remarks:****Client:** Nodarse and Associates**Project:** Material Testing-Nodarse**Sample Number:** UU-90%-B

Proj. No.: 6738-05-4573

Date: 6-10-05

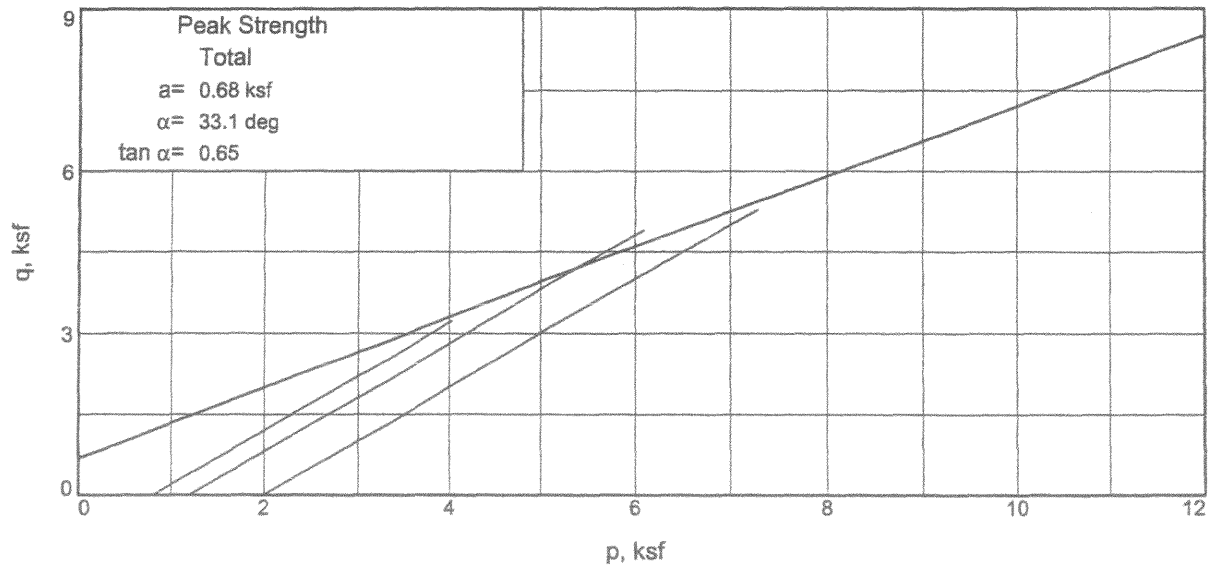
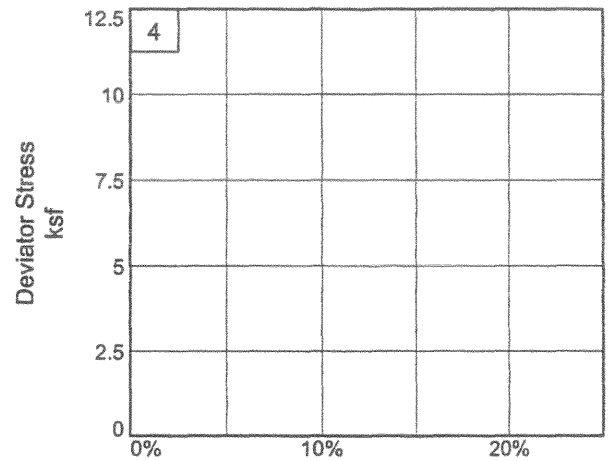
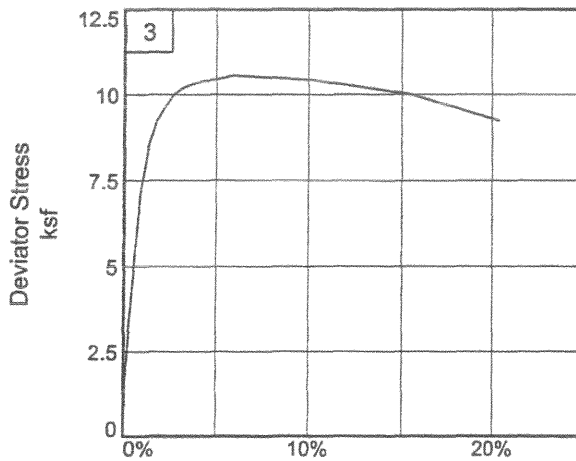
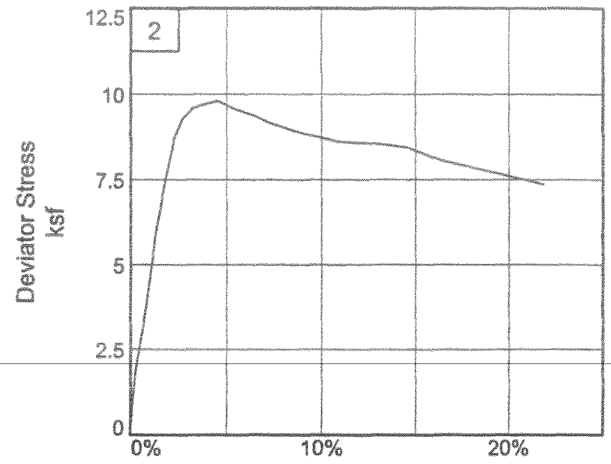
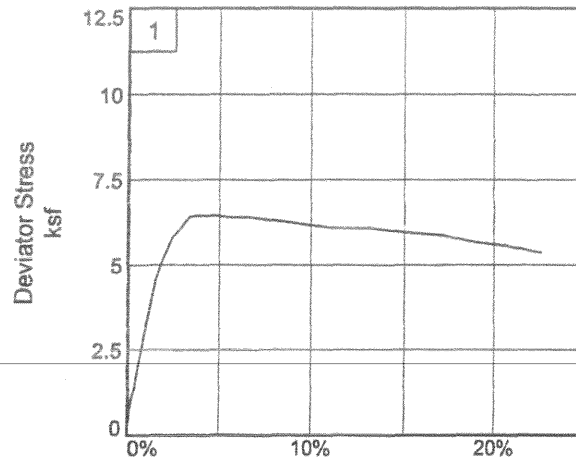
TRIAXIAL SHEAR TEST REPORT

MACTEC ENGINEERING AND CONSULTING, INC.

Reviewed By _____

Tested By: mc

Checked By: Rajni Sukhwani



Client: Nodarse and Associates
 Project: Material Testing-Nodarse
 Sample Number: UU-90%-B
 Project No.: 6738-05-4573

Reviewed By _____ MACTEC Engineering and Consulting, Inc.

Tested By: mc _____ Checked By: _____

TRIAXIAL COMPRESSION TEST

Unconsolidated Undrained

6/15/2005

10:45 AM

Date: 6-10-05
Client: Nodarse and Associates
Project: Material Testing-Nodarse
Project No.: 6738-05-4573
Sample Number: UU-90%-B
Description: Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments
Remarks:
Type of Sample: remolded
Specific Gravity=2.762 **LL=** **PL=** **PI=**
Test Method: COE uniform strain

Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	229.580		1194.700
Moisture content: Dry soil+tare, gms.	204.670		1041.000
Moisture content: Tare, gms.	55.040		115.200
Moisture, %	16.6	22.9	16.6
Moist specimen weight, gms.	1074.0		
Diameter, in.	2.84	2.83	
Area, in. ²	6.33	6.28	
Height, in.	5.32	5.29	
Net decrease in height, in.		0.03	
Wet Density, pcf	121.4	129.8	
Dry density, pcf	104.1	105.6	
Void ratio	0.6567	0.6334	
Saturation, %	70.0	100.0	

Test Readings for Specimen No. 1

Load ring constant = 3.313 lbs. per input unit
 Membrane modulus = 0.124105 kN/cm²
 Membrane thickness = 0.02 cm
 Cell pressure = 5.60 psi (0.81 ksf)
 Back pressure = 0.00 psi (0.00 ksf)
 Strain rate, in./min. = 0.05
 Fail. Stress = 6.45 ksf at reading no. 18

Test Readings for Specimen No. 1

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	0.81	0.81	1.00		0.81
1	0.0010	3.00	9.9	0.0	0.23	0.81	1.03	1.28		0.92
2	0.0050	10.00	33.1	0.1	0.76	0.81	1.57	1.94		1.19
3	0.0100	14.00	46.4	0.2	1.06	0.81	1.87	2.32		1.34
4	0.0150	17.00	56.3	0.3	1.29	0.81	2.10	2.60		1.45
5	0.0200	19.00	62.9	0.4	1.44	0.81	2.25	2.78		1.53
6	0.0250	24.00	79.5	0.5	1.82	0.81	2.62	3.25		1.71
7	0.0300	28.00	92.8	0.6	2.12	0.81	2.92	3.62		1.86
8	0.0350	31.00	102.7	0.7	2.34	0.81	3.15	3.90		1.98
9	0.0400	35.00	116.0	0.8	2.64	0.81	3.45	4.27		2.13
10	0.0450	39.00	129.2	0.8	2.94	0.81	3.75	4.65		2.28
11	0.0500	42.00	139.1	0.9	3.16	0.81	3.97	4.92		2.39
12	0.0750	60.00	198.8	1.4	4.50	0.81	5.30	6.58		3.05
13	0.1000	70.00	231.9	1.9	5.22	0.81	6.03	7.47		3.42
14	0.1250	78.00	258.4	2.4	5.79	0.81	6.60	8.18		3.70
15	0.1500	82.00	271.7	2.8	6.06	0.81	6.86	8.51		3.84
16	0.1750	87.00	288.2	3.3	6.40	0.81	7.20	8.93		4.00
17	0.2000	88.00	291.5	3.8	6.44	0.81	7.24	8.98		4.03
18	0.2500	89.00	294.9	4.7	6.45	0.81	7.25	8.99		4.03
19	0.3000	89.00	294.9	5.7	6.38	0.81	7.19	8.92		4.00
20	0.3500	90.00	298.2	6.6	6.39	0.81	7.20	8.92		4.00
21	0.4000	90.00	298.2	7.6	6.33	0.81	7.13	8.84		3.97
22	0.5000	90.00	298.2	9.4	6.20	0.81	7.00	8.68		3.90
23	0.6000	90.00	298.2	11.3	6.07	0.81	6.87	8.52		3.84
24	0.7000	92.00	304.8	13.2	6.07	0.81	6.88	8.53		3.84
25	0.8000	92.00	304.8	15.1	5.94	0.81	6.74	8.36		3.78
26	0.9000	93.00	308.1	17.0	5.87	0.81	6.67	8.28		3.74
27	1.0000	92.00	304.8	18.9	5.67	0.81	6.48	8.04		3.64
28	1.1000	92.00	304.8	20.8	5.54	0.81	6.35	7.87		3.58
29	1.2000	91.00	301.5	22.7	5.35	0.81	6.16	7.63		3.48

Parameters for Specimen No. 2

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	299.270		1196.700
Moisture content: Dry soil+tare, gms.	265.040		1041.800
Moisture content: Tare, gms.	51.880		106.200
Moisture, %	16.1	23.3	16.6
Moist specimen weight, gms.	1099.1		
Diameter, in.	2.84	2.83	
Area, in. ²	6.33	6.28	
Height, in.	5.50	5.47	
Net decrease in height, in.		0.03	
Wet Density, pcf	120.2	129.4	
Dry density, pcf	103.5	105.0	
Void ratio	0.6651	0.6425	
Saturation, %	66.7	100.0	

Test Readings for Specimen No. 2

Load ring constant = 3.313 lbs. per input unit

Membrane modulus = 0.124105 kN/cm²

Membrane thickness = 0.02 cm

Cell pressure = 8.30 psi (1.20 ksf)

Back pressure = 0.00 psi (0.00 ksf)

Strain rate, in./min. = 0.05

Fail. Stress = 9.79 ksf at reading no. 18

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	1.20	1.20	1.00		1.20
1	0.0010	3.00	9.9	0.0	0.23	1.20	1.42	1.19		1.31
2	0.0050	11.00	36.4	0.1	0.84	1.20	2.03	1.70		1.61
3	0.0100	18.00	59.6	0.2	1.37	1.20	2.56	2.14		1.88
4	0.0150	24.00	79.5	0.3	1.82	1.20	3.01	2.52		2.10
5	0.0200	28.00	92.8	0.4	2.12	1.20	3.32	2.77		2.26
6	0.0250	32.00	106.0	0.5	2.42	1.20	3.62	3.03		2.41
7	0.0300	37.00	122.6	0.5	2.80	1.20	3.99	3.34		2.59
8	0.0350	40.00	132.5	0.6	3.02	1.20	4.22	3.53		2.71
9	0.0400	45.00	149.1	0.7	3.40	1.20	4.59	3.84		2.89
10	0.0450	49.00	162.3	0.8	3.69	1.20	4.89	4.09		3.04
11	0.0500	54.00	178.9	0.9	4.07	1.20	5.26	4.40		3.23
12	0.0750	80.00	265.0	1.4	6.00	1.20	7.19	6.02		4.19
13	0.1000	100.00	331.3	1.8	7.46	1.20	8.66	7.24		4.93
14	0.1250	117.00	387.6	2.3	8.69	1.20	9.88	8.27		5.54
15	0.1500	126.00	417.4	2.7	9.31	1.20	10.51	8.79		5.85
16	0.1750	130.00	430.7	3.2	9.56	1.20	10.76	9.00		5.98
17	0.2000	132.00	437.3	3.7	9.67	1.20	10.86	9.09		6.03
18	0.2500	135.00	447.3	4.6	9.79	1.20	10.99	9.19		6.09
19	0.3000	133.00	440.6	5.5	9.55	1.20	10.75	8.99		5.97
20	0.3500	132.00	437.3	6.4	9.39	1.20	10.59	8.86		5.89
21	0.4000	130.00	430.7	7.3	9.16	1.20	10.35	8.66		5.77
22	0.5000	128.00	424.1	9.1	8.84	1.20	10.04	8.40		5.62
23	0.6000	127.00	420.8	11.0	8.59	1.20	9.79	8.19		5.49
24	0.7000	129.00	427.4	12.8	8.55	1.20	9.75	8.15		5.47

MACTEC Engineering and Consulting, Inc.

Test Readings for Specimen No. 2

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
25	0.8000	130.00	430.7	14.6	8.44	1.20	9.63	8.06		5.41
26	0.9000	127.00	420.8	16.4	8.07	1.20	9.26	7.75		5.23
27	1.0000	126.00	417.4	18.3	7.83	1.20	9.02	7.55		5.11
28	1.1000	125.00	414.1	20.1	7.59	1.20	8.79	7.35		4.99
29	1.2000	124.00	410.8	21.9	7.36	1.20	8.55	7.16		4.87

Parameters for Specimen No. 3

Specimen Parameter	Initial	Saturated	Final
Moisture content: Moist soil+tare, gms.	169.450		1346.000
Moisture content: Dry soil+tare, gms.	152.380		1169.600
Moisture content: Tare, gms.	50.720		115.300
Moisture, %	16.8	22.8	16.7
Moist specimen weight, gms.	1198.4		
Diameter, in.	2.84	2.83	
Area, in. ²	6.33	6.29	
Height, in.	5.90	5.88	
Net decrease in height, in.		0.02	
Wet Density, pcf	122.2	129.9	
Dry density, pcf	104.6	105.7	
Void ratio	0.6486	0.6310	
Saturation, %	71.5	100.0	

Test Readings for Specimen No. 3

Load ring constant = 3.313 lbs. per input unit

Membrane modulus = 0.124105 kN/cm²

Membrane thickness = 0.02 cm

Cell pressure = 13.90 psi (2.00 ksf)

Back pressure = 0.00 psi (0.00 ksf)

Strain rate, in./min. = 0.05

Fail. Stress = 10.56 ksf at reading no. 20

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	2.00	2.00	1.00		2.00
1	0.0010	8.00	26.5	0.0	0.61	2.00	2.61	1.30		2.30
2	0.0050	22.00	72.9	0.1	1.67	2.00	3.67	1.83		2.84
3	0.0100	31.00	102.7	0.2	2.35	2.00	4.35	2.17		3.18
4	0.0150	42.00	139.1	0.3	3.18	2.00	5.18	2.59		3.59
5	0.0200	50.00	165.7	0.3	3.78	2.00	5.78	2.89		3.89
6	0.0250	58.00	192.2	0.4	4.38	2.00	6.38	3.19		4.19
7	0.0300	66.00	218.7	0.5	4.98	2.00	6.98	3.49		4.49
8	0.0350	74.00	245.2	0.6	5.58	2.00	7.58	3.79		4.79
9	0.0400	81.00	268.4	0.7	6.10	2.00	8.10	4.05		5.05
10	0.0450	88.00	291.5	0.8	6.62	2.00	8.63	4.31		5.31
11	0.0500	95.00	314.7	0.9	7.14	2.00	9.15	4.57		5.57
12	0.0750	114.00	377.7	1.3	8.54	2.00	10.54	5.26		6.27
13	0.1000	124.00	410.8	1.7	9.25	2.00	11.25	5.62		6.62
14	0.1250	130.00	430.7	2.1	9.65	2.00	11.65	5.82		6.83
15	0.1500	135.00	447.3	2.6	9.98	2.00	11.98	5.99		6.99

MACTEC Engineering and Consulting, Inc.

Test Readings for Specimen No. 3

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Princ. Stress ksf	Major Princ. Stress ksf	1:3 Ratio	P ksf	Q ksf
16	0.1750	138.00	457.2	3.0	10.16	2.00	12.16	6.07		7.08
17	0.2000	140.00	463.8	3.4	10.26	2.00	12.26	6.12		7.13
18	0.2500	143.00	473.8	4.3	10.39	2.00	12.39	6.19		7.19
19	0.3000	145.00	480.4	5.1	10.44	2.00	12.44	6.21		7.22
20	0.3500	148.00	490.3	6.0	10.56	2.00	12.56	6.27		7.28
21	0.4000	149.00	493.6	6.8	10.53	2.00	12.53	6.26		7.27
22	0.5000	151.00	500.3	8.5	10.48	2.00	12.48	6.24		7.24
23	0.6000	153.00	506.9	10.2	10.42	2.00	12.42	6.21		7.21
24	0.7000	154.00	510.2	11.9	10.29	2.00	12.29	6.14		7.15
25	0.8000	155.00	513.5	13.6	10.16	2.00	12.16	6.07		7.08
26	0.9000	156.00	516.8	15.3	10.02	2.00	12.02	6.01		7.01
27	1.0000	155.00	513.5	17.0	9.76	2.00	11.76	5.87		6.88
28	1.1000	154.00	510.2	18.7	9.50	2.00	11.50	5.74		6.75
29	1.2000	153.00	506.9	20.4	9.24	2.00	11.24	5.61		6.62

Vaeth, Dick

From: Stathis Payiatakis [stathisp@nodarse.com]
Sent: Monday, February 06, 2006 7:53 AM
To: Vaeth, Dick
Cc: Stathis Payiatakis
Subject: FW: EAA Proctor

Dick,
As agreed on Friday
Regards
Stathis P

From: Coleman, Mark [mailto:MACOLEMAN@mactec.com]
Sent: Friday, February 03, 2006 3:15 PM
To: Stathis Payiatakis
Subject: EAA Proctor

Stathis,

I reviewed the select fill compaction test report for the EAA project, MACTEC project number 6738-05-4573-02. The test specification D-1557-91 procedure B modified shown on the report should be D-698-91 procedure B standard. If you have any questions please call.

Thanks,

Mark Coleman

MACTEC Engineering and Consulting

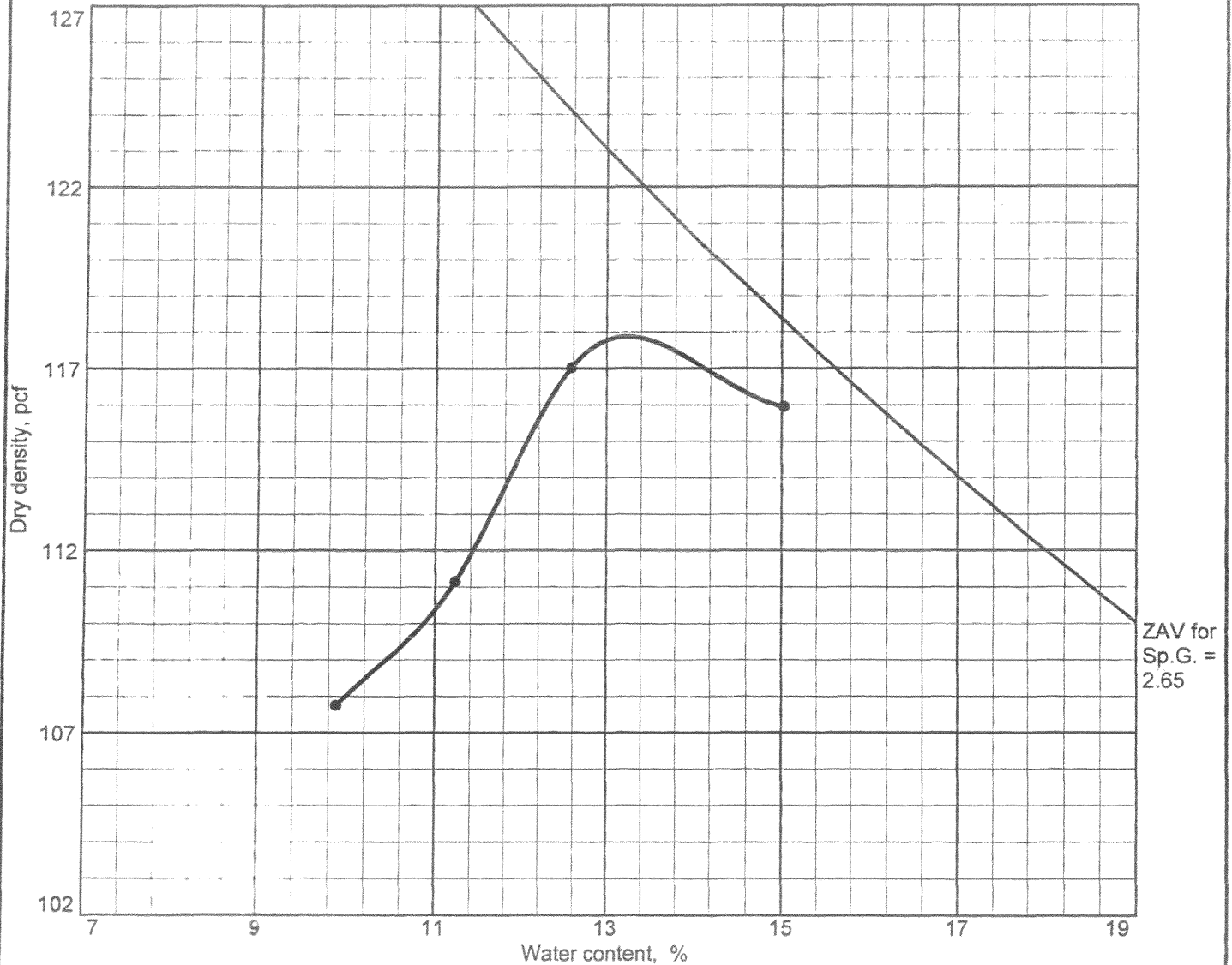
Jacksonville, Florida 32207

904-398-1084

Fax 904-398-1084

macoleman@mactec.com

COMPACTION TEST REPORT

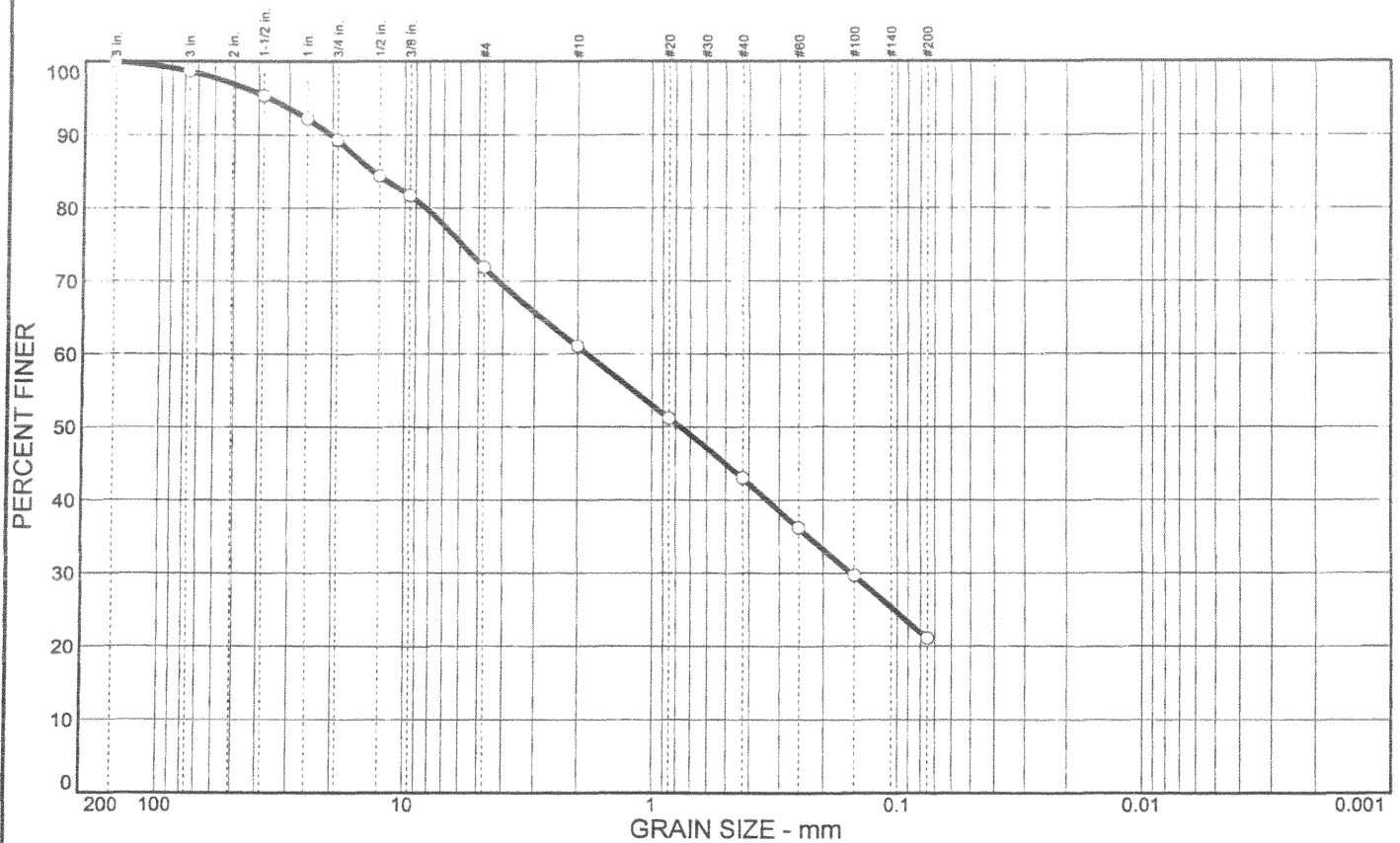


Test specification: ASTM D 1557-91 Procedure B Modified
 Oversize correction applied to each point

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > 3/8 in.	% < No.200
	USCS	AASHTO						
	SM	A-1-b					18.3	21.1

ROCK CORRECTED TEST RESULTS		MATERIAL DESCRIPTION
Maximum dry density = 118.0 pcf Optimum moisture = 13.0 %		Light gray and tan clayey fine SAND with limerock and shell fragments
Project No.: 6738-05-4573-02 Client: Nodarse and Associates, Inc. Project: EAA		
● Source: Select Fill		

Grain Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY	USCS	AASHTO	PL	LL
1.3	26.8	50.8	21.1		SM	A-1-b		

SIEVE inches size	PERCENT FINER			SIEVE number size	PERCENT FINER			SOIL DESCRIPTION
	○				○			
6	100.0			#4	71.9			○ Light gray and tan clayey fine SAND with limerock and shell fragments
3	98.7			#10	61.0			
1.5	95.3			#20	51.2			
1	92.2			#40	43.0			
.75	89.3			#60	36.2			
.5	84.4			#100	29.7			
.375	81.7			#200	21.1			
GRAIN SIZE								
D ₆₀	1.83							
D ₃₀	0.154							
D ₁₀								
COEFFICIENTS								REMARKS: ○
C _c								
C _u								

○ Source: Select Fill

Sample No.: composite

**MACTEC ENGINEERING.
AND CONSULTING, INC.**

Client: Nodarse and Associates, Inc.

Project: EAA

Project No.: 6738-05-4573-02

Reviewed By

GRAIN SIZE DISTRIBUTION TEST DATA

Client: Nodarse and Associates, Inc.

Project: EAA

Project Number: 6738-05-4573-02

Sample Data

Source: Select Fill

Sample No.: composite

Elev. or Depth:

Sample Length (in./cm.):

Location:

Description: Light gray and tan clayey fine SAND with limerock and shell fragments

Liquid Limit:

Plastic Limit:

USCS Classification: SM

AASHTO Classification: A-1-b

Testing Remarks:

Mechanical Analysis Data

Initial
 Dry sample and tare= 183928.00
 Tare = 0.00
 Dry sample weight = 183928.00
 Sample split on .5 inch sieve
 Split sample data:
 Sample and tare = 478.20 Tare = .00 Sample weight = 478.20
 Cumulative weight retained tare= .00
 Tare for cumulative weight retained= .00

Sieve	Cumul. Wt. retained	Percent finer
6 inch	0.00	100.0
3 inch	2404.00	98.7
1.5 inch	8637.00	95.3
1 inch	14330.00	92.2
.75 inch	19677.00	89.3
.5 inch	28701.00	84.4
.375 inch	15.49	81.7
# 4	70.85	71.9
# 10	132.55	61.0
# 20	188.10	51.2
# 40	234.34	43.0
# 60	273.23	36.2
# 100	309.97	29.7
# 200	358.68	21.1

Fractional Components

Gravel/Sand based on #4

Sand/Fines based on #200

% COBBLES = 1.3 % GRAVEL = 26.8 % SAND = 50.8
 % FINES = 21.1

D₈₅= 13.42 D₆₀= 1.83 D₅₀= 0.77D₃₀= 0.15

MOISTURE DENSITY TEST DATA

Client: Nodarse and Associates, Inc.

Project: EAA

Project Number: 6738-05-4573-02

Specimen Data

Source: Select Fill

Sample No.: composite

Elev. or Depth:

Sample Length (in./cm.):

Location:

Description: Light gray and tan clayey fine SAND with limerock and shell fragments

USCS Classification: SM

AASHTO Classification: A-1-b

Natural Moisture:

Liquid Limit:

Plasticity Index:

Testing Remarks:

Percent retained on 3/8 in. sieve: 18.3

Percent passing No. 200 sieve: 21.1

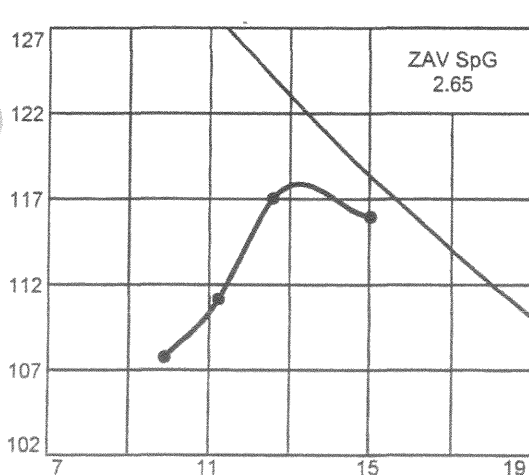
Specific gravity:

Test Data And Results

Type of test: ASTM D 1557-91 Procedure B Modified

Mold Dia.: 4.00 in. Hammer Wt.: 10 lb. Drop: 18 in.

Layers: five Blows per Layer: 25



POINT NO.	1	2	3	4
WM + WS	6084.0	6114.0	5941.0	5850.0
WM	4129.0	4129.0	4129.0	4129.0
WW+T	540.90	451.40	507.80	478.20
WD+T	478.20	388.78	455.60	435.46
TARE	0.00	0.00	0.00	0.00
MOIST	13.1	16.1	11.5	9.8

MOISTURE	12.6	15.0	11.2	9.9
DRY DEN	117.0	116.0	111.2	107.8

Max dry den= 118.0 pcf Opt moisture= 13.0 %

Max dry den= 115.5 pcf Opt moisture= 14.0 %

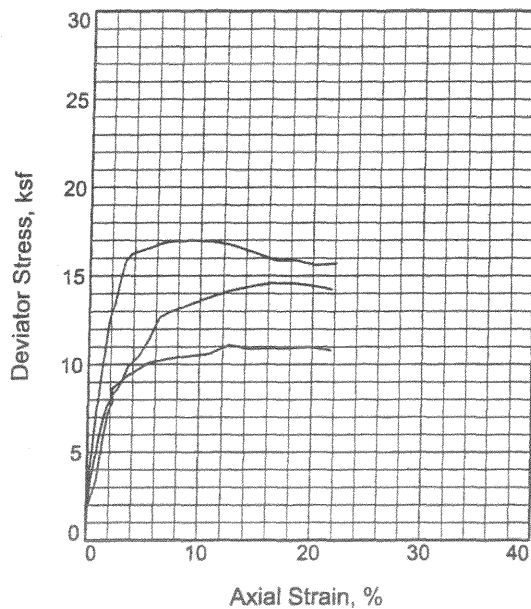
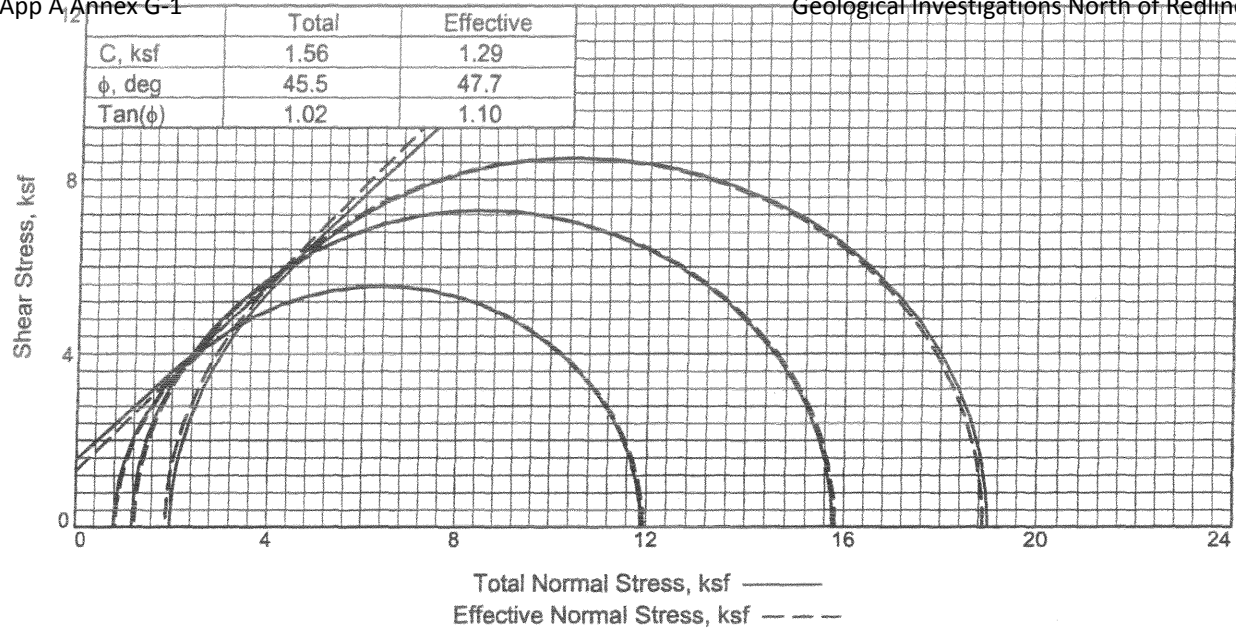
Uncorrected Results:

ASTM D 4718 Correction Data:

Bulk Specific Gravity of Oversize Material = 2.095

Moisture of Oversize Material = 10.2 %

Corrections Applied to Every Test Point



Sample No.		1	2	3
Initial	Water Content,	16.2	16.2	16.2
	Dry Density, pcf	108.3	108.0	110.0
	Saturation,	75.6	75.0	78.7
	Void Ratio	0.5917	0.5966	0.5674
	Diameter, in.	2.84	2.84	2.84
	Height, in.	5.58	5.54	5.43
At Test	Water Content,	20.1	21.1	20.0
	Dry Density, pcf	110.9	108.9	111.1
	Saturation,	100.0	100.0	100.0
	Void Ratio	0.5543	0.5836	0.5518
	Diameter, in.	2.82	2.83	2.83
	Height, in.	5.54	5.53	5.41
Strain rate, in./min.		0.05	0.05	0.05
Back Pressure, ksf		7.2	7.2	7.2
Cell Pressure, ksf		8.0	8.4	9.2
Fail. Stress, ksf		11.1	14.6	17.0
Total Pore Pr., ksf		7.2	7.1	7.3
Ult. Stress, ksf				
Total Pore Pr., ksf				
$\bar{\sigma}_1$ Failure, ksf		11.9	15.8	18.9
$\bar{\sigma}_3$ Failure, ksf		0.8	1.3	1.9

Type of Test:

CU with Pore Pressures

Sample Type: remold**Description:** Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments**Specific Gravity=** 2.762**Remarks:****Client:** Nodarse and Associates**Project:** Material Testing-Nodarse**Sample Number:** CU-95%-B

Proj. No.: 6738-05-4573

Date: 6-12-05

TRIAXIAL SHEAR TEST REPORT

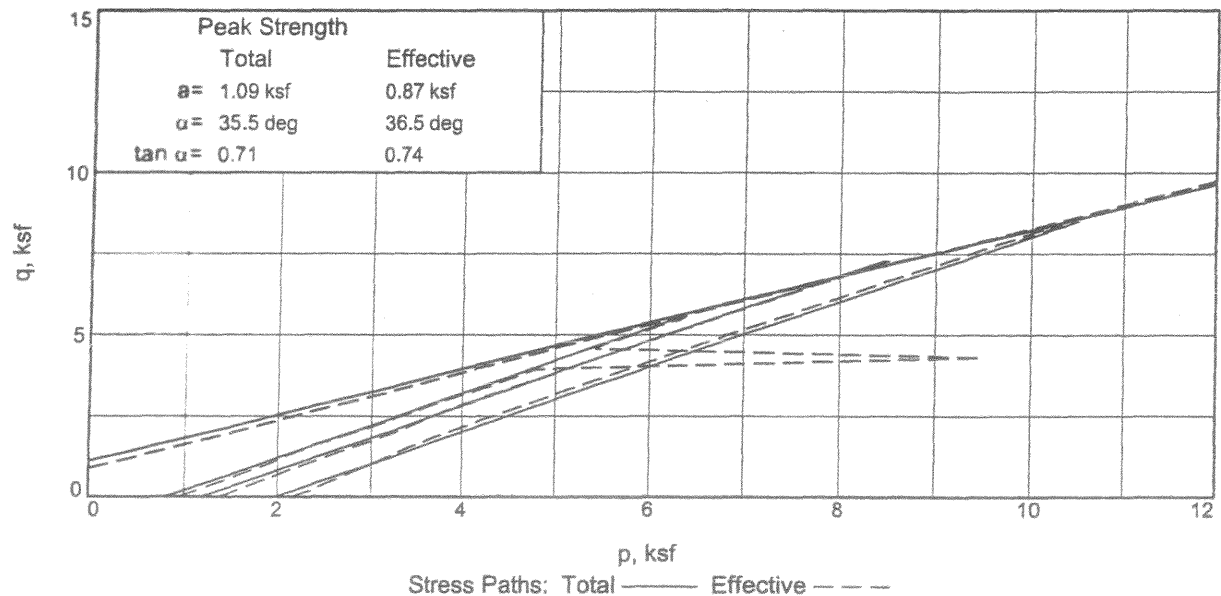
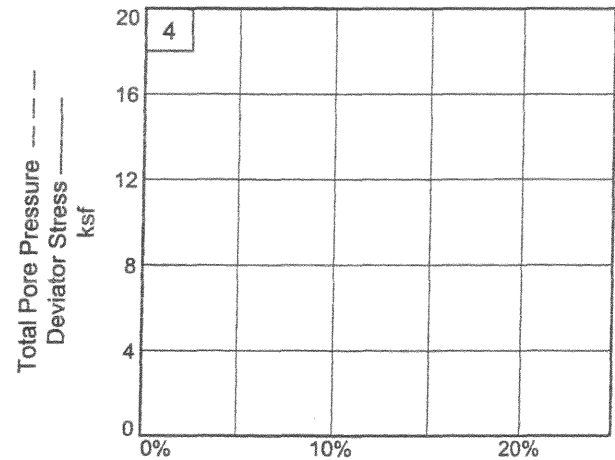
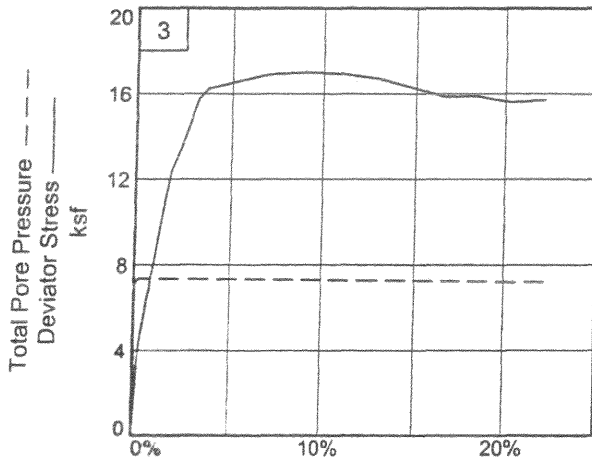
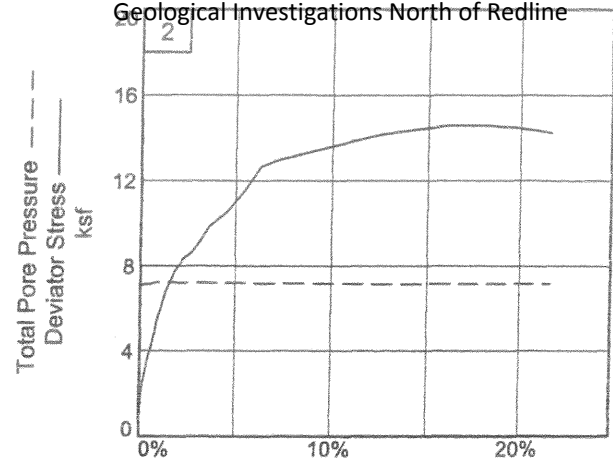
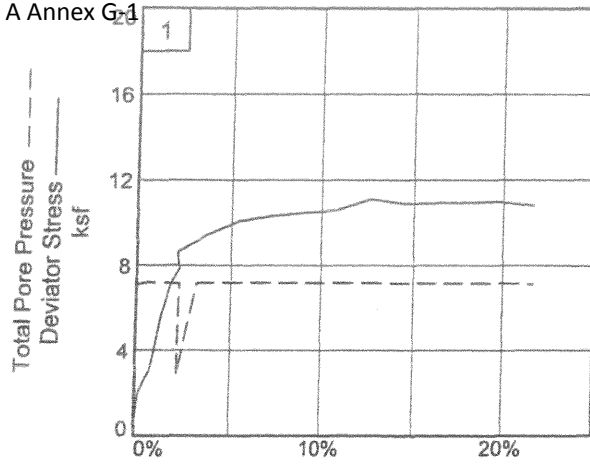
MACTEC ENGINEERING AND CONSULTING, INC.

Reviewed By _____

Tested By: mc

Checked By:

Lajmi Sukhwani



Client: Nodarse and Associates
 Project: Material Testing-Nodarse
 Sample Number: CU-95%-B
 Project No.: 6738-05-4573

Reviewed By _____ MACTEC Engineering and Consulting, Inc.

Tested By: mc _____ Checked By: _____

TRIAXIAL COMPRESSION TEST

CU with Pore Pressures

6/16/2005

10:57 AM

Date: 6-12-05
Client: Nodarse and Associates
Project: Material Testing-Nodarse
Project No.: 6738-05-4573
Sample Number: CU-95%-B
Description: Tan Slightly Clayey Silty Medium to Fine SAND with Shell and Rock Fragments
Remarks:
Type of Sample: remold
Specific Gravity: 2.762 **LL=** **PL=** **PI=**
Test Method: COE uniform strain

Parameters for Specimen No. 1

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	173.410			1326.000
Moisture content: Dry soil+tare, gms.	156.910			1142.000
Moisture content: Tare, gms.	55.030			115.790
Moisture, %	16.2	21.4	20.1	17.9
Moist specimen weight, gms.	1167.9			
Diameter, in.	2.84	2.84	2.82	
Area, in. ²	6.33	6.33	6.23	
Height, in.	5.58	5.58	5.54	
Net decrease in height, in.		0.00	0.04	
Wet Density, pcf	125.9	131.5	133.2	
Dry density, pcf	108.3	108.3	110.9	
Void ratio	0.5917	0.5917	0.5543	
Saturation, %	75.6	100.0	100.0	

Test Readings for Specimen No. 1

Load ring constant = 3.313 lbs. per input unit
 Membrane modulus = 0.124105 kN/cm²
 Membrane thickness = 0.02 cm
 Consolidation cell pressure = 55.60 psi (8.01 ksf)
 Consolidation back pressure = 50.00 psi (7.20 ksf)
 Consolidation effective confining stress = 0.81 ksf
 Strain rate, in./min. = 0.05
 Fail. Stress = 11.10 ksf at reading no. 24

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	0.95	0.95	1.00	49.00	0.95	0.00
1	0.0010	8.00	26.5	0.0	0.61	0.94	1.55	1.65	49.10	1.24	0.31
2	0.0050	19.00	62.9	0.1	1.45	0.91	2.36	2.60	49.30	1.63	0.73
3	0.0100	26.00	86.1	0.2	1.99	0.89	2.88	3.22	49.40	1.89	0.99
4	0.0150	29.00	96.1	0.3	2.21	0.88	3.09	3.52	49.50	1.98	1.11
5	0.0200	31.00	102.7	0.4	2.36	0.86	3.23	3.74	49.60	2.05	1.18
6	0.0250	34.00	112.6	0.5	2.59	0.84	3.43	4.10	49.80	2.13	1.29
7	0.0300	36.00	119.3	0.5	2.74	0.84	3.57	4.28	49.80	2.21	1.37
8	0.0350	38.00	125.9	0.6	2.89	0.82	3.71	4.52	49.90	2.27	1.44
9	0.0400	40.00	132.5	0.7	3.04	0.82	3.86	4.70	49.90	2.34	1.52
10	0.0450	43.00	142.5	0.8	3.26	0.82	4.08	4.98	49.90	2.45	1.63
11	0.0500	46.00	152.4	0.9	3.49	0.84	4.32	5.18	49.80	2.58	1.74
12	0.0750	75.00	248.5	1.4	5.66	0.85	6.51	7.66	49.70	3.68	2.83
13	0.1000	95.00	314.7	1.8	7.14	0.88	8.02	9.13	49.50	4.45	3.57
14	0.1250	105.00	347.9	2.3	7.85	0.86	8.72	10.09	49.60	4.79	3.93
15	0.1200	115.00	381.0	2.2	8.61	5.20	13.81	2.66	49.50	9.50	4.30
16	0.1750	123.00	407.5	3.2	9.11	0.88	9.99	11.38	49.50	5.44	4.56
17	0.2000	127.00	420.8	3.6	9.37	0.84	10.20	12.21	49.80	5.52	4.68
18	0.3000	139.00	460.5	5.4	10.06	0.84	10.89	13.04	49.80	5.86	5.03
19	0.3000	139.00	460.5	5.4	10.06	0.84	10.89	13.04	49.80	5.86	5.03
20	0.3500	142.00	470.4	6.3	10.18	0.84	11.01	13.19	49.80	5.92	5.09
21	0.4000	145.00	480.4	7.2	10.29	0.85	11.14	13.12	49.70	6.00	5.15
22	0.5000	150.00	497.0	9.0	10.44	0.85	11.29	13.29	49.70	6.07	5.22
23	0.6000	155.00	513.5	10.8	10.57	0.85	11.42	13.45	49.70	6.14	5.29
24	0.7000	166.00	550.0	12.6	11.10	0.85	11.95	14.06	49.70	6.40	5.55
25	0.8000	166.00	550.0	14.5	10.87	0.86	11.73	13.58	49.60	6.30	5.43
26	0.9000	170.00	563.2	16.3	10.89	0.86	11.76	13.61	49.60	6.31	5.45
27	1.0000	174.00	576.5	18.1	10.91	0.86	11.77	13.63	49.60	6.32	5.45
28	1.1000	179.00	593.0	19.9	10.98	0.88	11.85	13.49	49.50	6.37	5.49
29	1.2000	180.00	596.3	21.7	10.79	0.89	11.68	13.08	49.40	6.29	5.39

Correction
made
7/16/05

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	173.410			1288.400
Moisture content: Dry soil+tare, gms.	156.910			1108.100
Moisture content: Tare, gms.	55.030			95.600
Moisture, %	16.2	21.6	21.1	17.8
Moist specimen weight, gms.	1156.0			
Diameter, in.	2.84	2.84	2.83	
Area, in. ²	6.33	6.33	6.30	
Height, in.	5.54	5.54	5.53	
Net decrease in height, in.		0.00	0.01	
Wet Density, pcf	125.5	131.3	131.9	
Dry density, pcf	108.0	108.0	108.9	
Void ratio	0.5966	0.5966	0.5836	
Saturation, %	75.0	100.0	100.0	

Test Readings for Specimen No. 2

Load ring constant = 3.313 lbs. per input unit

Membrane modulus = 0.124105 kN/cm²

Membrane thickness = 0.02 cm

Consolidation cell pressure = 58.30 psi (8.40 ksf)

Consolidation back pressure = 50.00 psi (7.20 ksf)

Consolidation effective confining stress = 1.20 ksf

Strain rate, in./min. = 0.05

Fail. Stress = 14.58 ksf at reading no. 26

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	1.38	1.38	1.00	48.70	1.38	0.00
1	0.0010	10.00	33.1	0.0	0.76	1.35	2.11	1.56	48.90	1.73	0.38
2	0.0050	24.00	79.5	0.1	1.82	1.31	3.13	2.39	49.20	2.22	0.91
3	0.0100	33.00	109.3	0.2	2.49	1.30	3.79	2.92	49.30	2.54	1.25
4	0.0150	39.00	129.2	0.3	2.95	1.28	4.23	3.30	49.40	2.75	1.47
5	0.0200	44.00	145.8	0.4	3.32	1.28	4.60	3.59	49.40	2.94	1.66
6	0.0250	49.00	162.3	0.5	3.69	1.27	4.96	3.91	49.50	3.11	1.85
7	0.0300	53.00	175.6	0.5	3.99	1.27	5.26	4.15	49.50	3.26	2.00
8	0.0350	57.00	188.8	0.6	4.29	1.25	5.54	4.42	49.60	3.40	2.14
9	0.0400	62.00	205.4	0.7	4.66	1.22	5.88	4.81	49.80	3.55	2.33
10	0.0450	66.00	218.7	0.8	4.96	1.20	6.15	5.15	50.00	3.67	2.48
11	0.0500	72.00	238.5	0.9	5.40	1.17	6.57	5.63	50.20	3.87	2.70
12	0.0750	91.00	301.5	1.4	6.80	1.17	7.96	6.83	50.20	4.56	3.40
13	0.1000	104.00	344.6	1.8	7.73	1.20	8.93	7.47	50.00	5.06	3.87
14	0.1250	112.00	371.1	2.3	8.29	1.20	9.48	7.94	50.00	5.34	4.14
15	0.1500	117.00	387.6	2.7	8.62	1.20	9.81	8.21	50.00	5.50	4.31
16	0.1750	125.00	414.1	3.2	9.17	1.20	10.36	8.67	50.00	5.78	4.58
17	0.2000	135.00	447.3	3.6	9.85	1.21	11.06	9.15	49.90	6.14	4.93
18	0.2500	145.00	480.4	4.5	10.48	1.21	11.69	9.67	49.90	6.45	5.24
19	0.3000	160.00	530.1	5.4	11.46	1.21	12.67	10.47	49.90	6.94	5.73
20	0.3500	178.00	589.7	6.3	12.62	1.22	13.85	11.31	49.80	7.54	6.31
21	0.4000	184.00	609.6	7.2	12.92	1.22	14.15	11.56	49.80	7.69	6.46
22	0.5000	194.00	642.7	9.0	13.36	1.24	14.60	11.79	49.70	7.92	6.68
23	0.6000	204.00	675.9	10.9	13.77	1.25	15.02	11.99	49.60	8.14	6.88

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No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
24	0.7000	214.00	709.0	12.7	14.15	1.27	15.42	12.17	49.50	8.34	7.08
25	0.8000	222.00	735.5	14.5	14.38	1.27	15.64	12.34	49.50	8.46	7.19
26	0.9000	230.00	762.0	16.3	14.58	1.25	15.83	12.64	49.60	8.54	7.29
27	1.0000	235.00	778.6	18.1	14.57	1.25	15.83	12.63	49.60	8.54	7.29
28	1.1000	238.00	788.5	19.9	14.43	1.25	15.69	12.52	49.60	8.47	7.22
29	1.2000	240.00	795.1	21.7	14.23	1.25	15.48	12.36	49.60	8.37	7.11

Parameters for Specimen No. 3

Specimen Parameter	Initial	Saturated	Consolidated	Final
Moisture content: Moist soil+tare, gms.	132.350			1281.400
Moisture content: Dry soil+tare, gms.	121.490			1110.500
Moisture content: Tare, gms.	54.280			106.100
Moisture, %	16.2	20.5	20.0	17.0
Moist specimen weight, gms.	1153.8			
Diameter, in.	2.84	2.84	2.83	
Area, in. ²	6.33	6.33	6.29	
Height, in.	5.43	5.43	5.41	
Net decrease in height, in.		0.00	0.02	
Wet Density, pcf	127.8	132.6	133.3	
Dry density, pcf	110.0	110.0	111.1	
Void ratio	0.5674	0.5674	0.5518	
Saturation, %	78.7	100.0	100.0	

Test Readings for Specimen No. 3

Load ring constant = 3.313 lbs. per input unit

Membrane modulus = 0.124105 kN/cm²

Membrane thickness = 0.02 cm

Consolidation cell pressure = 63.90 psi (9.20 ksf)

Consolidation back pressure = 50.00 psi (7.20 ksf)

Consolidation effective confining stress = 2.00 ksf

Strain rate, in./min. = 0.05

Fail. Stress = 17.00 ksf at reading no. 22

No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
0	0.0000	0.00	0.0	0.0	0.00	2.17	2.17	1.00	48.80	2.17	0.00
1	0.0010	5.00	16.6	0.0	0.38	2.17	2.55	1.17	48.80	2.36	0.19
2	0.0050	22.00	72.9	0.1	1.67	2.03	3.70	1.82	49.80	2.86	0.83
3	0.0100	39.00	129.2	0.2	2.95	1.90	4.85	2.55	50.70	3.38	1.48
4	0.0150	52.00	172.3	0.3	3.93	1.86	5.79	3.12	51.00	3.82	1.97
5	0.0200	62.00	205.4	0.4	4.68	1.84	6.53	3.54	51.10	4.18	2.34
6	0.0250	69.00	228.6	0.5	5.21	1.84	7.05	3.82	51.10	4.45	2.60
7	0.0300	77.00	255.1	0.6	5.81	1.84	7.65	4.15	51.10	4.75	2.90
8	0.0350	85.00	281.6	0.6	6.40	1.84	8.25	4.47	51.10	5.04	3.20
9	0.0400	91.00	301.5	0.7	6.85	1.84	8.69	4.72	51.10	5.27	3.42
10	0.0450	98.00	324.7	0.8	7.37	1.84	9.21	5.00	51.10	5.53	3.68
11	0.0500	104.00	344.6	0.9	7.81	1.84	9.65	5.24	51.10	5.75	3.91
12	0.0750	138.00	457.2	1.4	10.32	1.86	12.17	6.55	51.00	7.02	5.16
13	0.1000	166.00	550.0	1.8	12.35	1.86	14.21	7.65	51.00	8.03	6.18

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No.	Def. Dial in.	Load Dial	Load lbs.	Strain %	Deviator Stress ksf	Minor Eff. Stress ksf	Major Eff. Stress ksf	1:3 Ratio	Pore Press. psi	P ksf	Q ksf
14	0.1250	180.00	596.3	2.3	13.33	1.86	15.19	8.18	51.00	8.52	6.67
15	0.1500	198.00	656.0	2.8	14.60	1.87	16.47	8.80	50.90	9.17	7.30
16	0.1750	215.00	712.3	3.2	15.77	1.87	17.64	9.43	50.90	9.76	7.89
17	0.2000	222.00	735.5	3.7	16.21	1.87	18.08	9.66	50.90	9.98	8.10
18	0.2500	227.00	752.1	4.6	16.41	1.87	18.29	9.77	50.90	10.08	8.21
19	0.3000	232.00	768.6	5.5	16.61	1.87	18.49	9.87	50.90	10.18	8.31
20	0.3500	237.00	785.2	6.5	16.81	1.87	18.68	9.98	50.90	10.27	8.40
21	0.4000	241.00	798.4	7.4	16.92	1.89	18.81	9.97	50.80	10.35	8.46
22	0.5000	247.00	818.3	9.2	17.00	1.90	18.90	9.94	50.70	10.40	8.50
23	0.6000	251.00	831.6	11.1	16.92	1.92	18.83	9.83	50.60	10.37	8.46
24	0.7000	253.00	838.2	12.9	16.70	1.93	18.63	9.65	50.50	10.28	8.35
25	0.8000	252.00	834.9	14.8	16.28	1.94	18.22	9.37	50.40	10.08	8.14
26	0.9000	251.00	831.6	16.6	15.86	1.96	17.82	9.10	50.30	9.89	7.93
27	1.0000	257.00	851.4	18.5	15.88	1.97	17.86	9.05	50.20	9.91	7.94
28	1.1000	258.00	854.8	20.3	15.58	1.99	17.57	8.84	50.10	9.78	7.79
29	1.2000	266.00	881.3	22.2	15.69	2.00	17.70	8.84	50.00	9.85	7.85